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THE
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A RECORD OF CURRENT LITERATURE

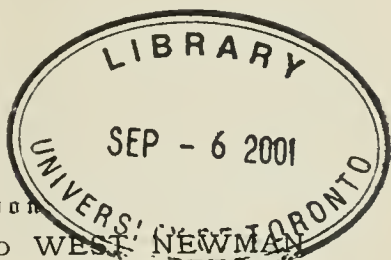
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THE JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY.

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THE
JOURNAL OF LARYNGOLOGY,
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**ON THROAT, NOSE, AND EAR DISEASES AND THEIR
TREATMENT IN JOHN HUNTER'S TIME. RESUMÉ OF
A PRESIDENTIAL ADDRESS DELIVERED BEFORE THE
HUNTERIAN SOCIETY ON OCTOBER 27, 1915.**

BY W. H. KELSON, M.D., F.R.C.S.,
Surgeon to the London Throat Hospital.

THE lecturer, after referring to the sparsity of the literature on this subject, pointed out that the treatment of these diseases was at this period entirely in the hands of general physicians and surgeons, mostly surgeons, and as regards the larynx it was practically *nil*, the laryngoscope not being in use at this time. Amongst writers on these subjects the names of Fothergill, Cheselden, Pott, Huxham, Bell, and Sharpe, stand out prominently; curiously, diseases of the throat, nose and ear, are frequently compared with affections of the vagina, rectum, and urethra, with which these gentlemen seem to have been exceedingly familiar. As regards the throat, enlargement of the tonsils is termed a scirrhusity, and should be treated by ligature, one being dealt with at a time, the ligature, which is best passed through the nose, being gradually tightened up till the hypertrophy sloughs off. Enlarged uvula, if slight, should be treated with Peruvian or oak bark infusion, alum, or vitriolic acid; if larger, by amputation with bistoury or scissors; if very large and fleshy, by ligature. Hæmorrhage, after this

operation, may be checked by ardent spirits or lunar caustic. Inflammatory conditions of the throat should be treated by scarification and fomentation, and a tongue spatula, with concealed knife-blade, is figured; also a can with flexible tube attached, for the inhalation of steam. About this period (1747) a very infectious disease appears to have been imported into this country from the shores of the Mediterranean termed malignant ulcerous sore throat. Extensive sloughing occurred, and hæmorrhage from the nose or throat sometimes proved fatal. It was most common in children. Treatment, the physician says, should be by stimulants, aromatic gargles, antiseptics, and detergents, and he mentions sage tea, vinegar, and tincture of myrrh. Internally, bark and opium are recommended. As regards the nose, the most important affections are said to be hæmorrhages from the nostrils, ozæna, and imperforate nostrils, and polypus excrecences. To check hæmorrhage in slight cases cold and alum are chiefly relied on; if more severe, pressure from a dossil of lint, or better, a piece of hog's gut is made into a bladder by tying one end, and this having been inserted into the nose is filled with cold vinegar by means of a syringe through the end of the gut hanging out of the nostril. This is afterwards tied up.

Ozæna is described as a general term applied to foul ulceration of the interior of the nose, discharging a fœtid matter. Caries is generally present. For its treatment, decoction of walnut leaves, Peruvian or oak bark, alum, limewater, or ardent spirits, are recommended, applied on dossils of lint. Also an ointment of calomel, zine, or lapis calaminaris may be used. Fœtid discharge of dark colour denotes caries. Lues venerea should always be thought of in these cases, and if suspected the patient put on a long course of mercury. The writer states that though "many cases may be cured, no remedies with which we are acquainted can with certainty be depended on."

"Should, however, the running be produced by other diseases, especially matter in the maxillary antrum, every effort to cure it, as above stated, may be resisted."

This affection is referred to by John Hunter himself in his "Prætical Treatises on Diseases of the Teeth," and it is advised that the matter be evacuated either through a tooth socket or the canine fossa. The intra-nasal route was, it is stated, used by some surgeons, but could not be recommended.

Every part of the nasal cavity and back part of throat may be affected with polypi, which are of two kinds, the firm and the soft;

the former are often painful and ulcerated, and may become cancerous, whilst the latter may cause perplexity by becoming very large and falling down on to the lips, also interfering with deglutition and respiration, but a much better prognosis should be given with this form.

As regards these latter, their growth may be checked by alum and ardent spirits, but for removal a silver wire passed through a double cannula is recommended in preference to forceps, which, however, were largely used; other methods employed were the cautery passed through a metal tube, setons, caustics, and scissors. Polypus excrescences may also occur in the œsophagus and pharynx, and be removed in the same way; if the application of the ligature threatens to be difficult and tedious, an easy open respiration during the operation may be obtained by previously performing bronchotomy. As it is very desirable that the point of origin of the excrescence be accurately discovered, the patient should be placed, if possible, so that the sun's rays fall into the nostril. When the polypi are so large as to prevent the application of ligature or forceps, the nostril may be laid open by a longitudinal incision, the parts being afterwards reunited with plaster or stitches.

A surgeon, speaking of the polypus of the nose, says it is "a complaint always troublesome, frequently painful, and sometimes hazardous," and lays stress on distinguishing between the red hard form, and the soft grey kind; and recommends that the former should never be touched, as matters will only be made worse, and the writer states that he has seen "hæmorrhages which have been frightful and inflammations which have proved fatal as the result of mistaking the one kind for the other," and he mentions a case in which "an untoward looking polypus which was attached to a distempered septum nasi came away with it, and a similar thing happened with the os palati."

But little is stated about ear diseases, one surgeon, however, says that deafness may be due to blocking of either the meatus auditorius externus, or the tuba Eustachiana, and goes on to say that any preternatural fulness of the amygdalæ or tonsils is always attended with some degree of deafness, and a cure will result from their removal. For the removal of foreign bodies, the injection of oil followed by water is advised. Polypus excrescences may occur, and should be removed if pedunculated by ligature, if not, the obstruction is likened to what occurs in the urethra, and the surgeon states that a well-oiled bougie duly persisted in proves equally serviceable in both, though he admits that at first "some uneasi-

ness is apt to be created." Also solution of alum, saccharum saturni, and French brandy are useful in discharges from both urethra and auditory meatus.

WHEN SHALL WE OPERATE IN CHRONIC MAXILLARY SINUSITIS AND WHAT FORM OF OPERATION SHALL WE CHOOSE?

By ROSS HALL SKILLERN, M.D. Philadelphia.

WHEN a patient presents himself, and a positive diagnosis of chronic purulent maxillary sinusitis is made, it is oftentimes a serious problem to determine the appropriate procedure to be adopted in order to rid him of his complaint in the shortest possible time, with the least inconvenience to himself. It is obviously bad judgment to immediately subject him to a more or less painful operation when persevering conservative treatment will bring about a cure, while, on the other hand, it is a waste of the surgeon's time and the patient's money to persist in a long tedious conservative form of treatment, when, after a few days, it is perfectly evident that some form of radical operation is indicated. In order to properly solve the first problem (when to operate) many factors must be taken into consideration.

(1) *The General Condition of the Patient.*—If the patient was severely affected, unable to follow his usual occupation, suffering from continuous or intermittent pain, head suffused and congested, sleep badly disturbed, profuse, purulent discharge from nose and posteriorly into throat (sudden suppression and stagnation of secretion is even worse), intermittent fever, and generally miserable; immediate evacuation by means of the needle puncture should be accomplished with strict rest in bed, the application of ice bags to the affected side of the face and forehead, in conjunction with a brisk calomel and soda purge. This treatment under such circumstances would suggest itself, for it at once gives the patient the benefit of the doubt, as it in all probability will bring about an amelioration of the symptoms, and at the same time put the patient in a better condition should an operation subsequently be demanded. This can be accomplished the following day or the following week as necessity dictates.

(2) *The History of the Disease.*—If a patient states that he has been troubled for several years with his nose, but only lately has the discharge been profuse and the headaches severe and persistent,

we can be reasonably certain that it has slowly assumed a chronic form, and in all probability will be resistant to ordinary treatment. Here, however, all things being considered, an operation in the very near future is clearly not indicated. The needle puncture with lavage should be instituted and continued daily as long as the patient shows any signs of improvement. This will manifest itself in the character and appearance of the secretion. If it begins to show changes in its character, becomes less fetid, loses its crumbly, milky appearance, becomes thicker and does not mix so intimately with the irrigating fluid, as well as diminishing in quantity, the conservative treatment should be persevered in. It not infrequently occurs, however, that under this form of treatment the disease becomes checked and reaches a certain stage when the patient is relatively comfortable, the discharge being at a minimum and the headaches controlled, yet if the time between the treatments is lengthened, an immediate exacerbation of the symptoms occurs. In these cases other drugs should be applied to the mucosa of the sinus in addition to the normal saline solution of the irrigating liquid. Nature must be further assisted than is possible with mere evacuation of the purulent secretion and cleanliness accomplished by the lavage. The lining mucous membrane of the sinus is evidently in such a diseased condition that it cannot throw off the infection with these means, but requires asepsis and stimulation. This can be accomplished with either alcohol or a solution of nitrate of silver in varying strengths. After the normal saline solution has been expelled from the sinus by causing the patient to bend the head toward the sound side and forcibly injecting air through the needle until no more liquid appears, the syringe is partially filled (about two ounces) with 50 per cent. alcohol and the sinus slowly filled, the head being held in the upright position until the alcohol begins to trickle out of the nose. The needle is then withdrawn, leaving the alcohol in the sinus. This should be repeated after every irrigation until full strength alcohol is used. If the disease continues to resist this form of treatment, a solution of nitrate of silver may be substituted for the alcohol. The initial strength can be 30 grains to the ounce, gradually increasing until a 25 per cent. solution (120 grains to the ounce) is applied. If this fails to bring about a marked improvement in a very short time (five irrigations), some form of a radical operation must be considered. At this point let us for a moment consider the advisability of using a heavier or more forcible stream of liquid than is possible with the ordinary exploring needle. It is, of course, impossible to

throw a stream with much cleansing strength through an instrument with such a small lumen as the needle. On this account, it has been argued that the Kransse trocar and cannula is much better fitted for this work, and possesses decided advantages over the needle on account of the comparatively heavy stream made possible by its use. It has been my experience that where the needle has failed the trocar has also been unavailing, therefore why should one submit the patient to the pain always incident to the passage of this instrument when the needle puncture can be repeated with little or no discomfort?

Recurrent Attacks.—If, on questioning, it is evident that the disease is of long standing, acute exacerbations being frequent, and one present at the inception of the present treatment, the indication for a radical operation lies largely with the patient himself. He knows that conservative treatment will probably bring about an amelioration of the symptoms, as it has done many times previously, at the same time he is cognisant of the fact that a cure will not be obtained, although perhaps hoping that this may actually be his last attack. There the surgeon's duty is clear. He can either institute the conservative treatment, promising the patient little in the hope of an ultimate cure, or advise a radical operation at once, citing otherwise a continuation of the attacks in increasing severity until the operation is urgent, running at the same time a certain risk of orbital and even cerebral complications, when it will be too late for surgical interference to be of avail. The responsibility in any event is placed entirely with the patient.

There is one history which, when present, demands an immediate operation, *i.e.*, maxillary sinusitis of dental origin. Antral suppuration resulting from the teeth occurs in approximately 20 per cent. of all cases. It is always extremely chronic, being, in fact, chronic from its inception. The pathological process being an extremely slow one causes a low grade form of inflammation along the floor of the sinus, in the alveolar fossa. Even should the offending root have previously been removed, the disease remains, showing but little tendency toward a spontaneous cure unless good drainage has been established. Suppose, however, nothing had been done, and certain symptoms pointed toward dental involvement. One or two of the upper (premolar to wisdom) were sensitive to heat and cold, or percussion with a metal instrument, or felt longer than their immediate fellows. An X ray film should immediately be taken to determine precisely the particular roots affected, as well as the extent of the disease. This is particu-

larly important, as it must not be forgotten that idiopathic antral disease may secondarily affect the teeth roots, especially if little or no cancellated bone tissue lies between their apices and the floor of the antrum. In this way it is often possible to prevent a slightly diseased tooth which is amenable to treatment from being needlessly sacrificed. If, on the other hand, the film showed us that the root was primarily affected, the corresponding tooth must immediately be extracted, and the root canal sufficiently enlarged with a suitable borer to enable one to irrigate the sinus thoroughly and to keep the opening patulous with a well-fitting prothesis made by a dentist. Daily irrigation through this opening in the alveolus will bring about a cure in almost every case of antritis of dental origin, provided of course that permanent pathological changes have not taken place in the mucosa of the sinus. The same form of treatment should be instituted in those forms of maxillary sinusitis coupled with manifest caries in a tooth where it is possible to connect the two directly by passing a fine sound through the carious portion of the tooth directly into the sinus cavity. The antiquated treatment of attempting to favour continuous drainage by the installation of a tube in the opening is as uncleanly as it is insufficient, and should be abandoned.

(3) *The probable Pathological Condition of the Sinus Mucosa and the Osseous Walls.*—When this can even approximately be determined our indications are much clearer than is otherwise the case. If permanent pathological changes in the form of polyps or polypoid hypertrophies are present in the antrum, we can irrigate until Doomsday with no appreciable effect on the condition. The condition of the mucosa can be judged in several ways. (a) By the consistency of the secretion. If it remains granular, sinking to the bottom of the pus basin, mixing with the irrigating fluid, or continuing foetid, we can be assured that such changes have taken place in the mucosa as to preclude the possibility of a cure by the irrigating route. (b) If the irrigating fluid seems to meet with continual resistance at every attempt at lavage it is probable that the mucosa is so swollen that the point of the needle becomes therein embedded. (c) When the X ray shows little diminution in the shadow immediately after lavage it is caused by the swollen mucosa or polypoid hypertrophies. If either or all of these signs and symptoms are present, some form of radical operation which will enable one to thoroughly rid the cavity of these pathological products is unquestionably called for. If the bony walls underlying the mucosa show signs of involvement from the diseased mucosa,

immediately an indication for prompt operative interference is given. This manifests itself by tenderness, and in some cases cedematous swelling over the antrum. The pain is particularly marked at night. The character of the discharge furnishes a clue, and osseous disease should be suspected when it remains fœtid and crumbling, despite frequent irrigations followed by nitrate of silver injections.

(4) *Occupation, Social Condition, Age and Sex. General Condition of Patient.*—The possession of a chronic purulent maxillary sinusitis is of far greater import to individuals following certain occupations than to others in different lines of work. Thus a school teacher, a barber, a hotel clerk or others in similar employment, who constantly come into more or less personal contact with a large number of people, find it very much to their disadvantage to be continually hawking, expectorating, and blowing the nose, while masons, drivers, plumbers, and outside workers in general can carry a diseased antrum around with very much less discomfort. In these separate occupations it is much more than a personal question as to whether they shall be quickly rid of their ailment or continue treatment for an indefinite period. In the former a disease of this character may mean the loss of their position, while in the latter this phase hardly enters into the consideration. It is always wise, therefore, in considering the advisability of operating, to first bear in mind the particular calling of the individual. The social condition of the patient very often gives a decided indication as to the present lines of treatment. It is obvious that they who have plenty of time and means at their disposal will prove much more favourable subjects for conservative treatment than those whose time and money are limited. The former are, as a rule, not only willing to present themselves at frequent intervals for treatment, and to carry out home instructions, but are anxious to avoid any form of operation as long as they are made fairly comfortable. With the latter this is not always feasible. In the first place, they cannot always present themselves at certain times, nor can they always give themselves the proper attention, therefore, the opportunity for a quick permanent cure through operative interference offers them a much brighter outlook, even though it entails the loss of a few days' time. Young people who are to be married in the immediate future must be rid of their complaint at the earliest possible moment, therefore an operation is imperative. Age is an important factor which must not be overlooked. Any form of a purulent maxillary sinusitis in the very young (six months to twelve

years) which shows a tendency to become chronic should cause immediate surgical intervention. In these tender ages the bones of the face are very soft and are particularly prone to inflammation (osteitis, osteo-myelitis, and periostitis). When the osseous structure once becomes thoroughly infected the task of a complete cure is usually hopeless. Another factor is that the sinuses themselves are very small, and the operation is usually not very extensive. Some authorities consider all purulent maxillary sinusitis in children a true osteo-myelitis. Generally speaking this is true if the disease has progressed any length of time, but it is also true that the mucosa of the sinus was probably the primary structure affected, and the infection had spread by contiguity to the surrounding osseous structures. Scarlet fever furnishes an exception, in that the bone appears to be affected simultaneously with the mucosa, and the disease runs a most intractable course, being often resistant even to the most radical measures.

In young adults the general system is usually vigorous, and will respond quicker to conservative means than older persons. Simple daily lavage in the former, coupled with appropriate vaccines, will often accomplish in a week what would require months to procure in those of riper age, therefore it is wise to exercise patience with these cases, and remember that a cure has been accomplished only after a considerable number of treatments. (In one case fifty-nine irrigations.) On the other hand we must bear in mind, particularly in girls and young women, the possibility of the disease making such headway that even after a radical operation the cure is not complete. It is indeed a great handicap for a woman to be obliged to carry a chronic catarrh to her dying day, even though it incommode only to the extent of the necessity of an excessive number of handkerchiefs.

In the adult, complications in the form of other diseases in conjunction with the sinusitis are not infrequently encountered, and must receive due consideration. Thus, in a case of chronic Bright's disease, or other condition where a general anæsthetic or even a surgical shock is contraindicated, any form of a radical operation should be approached cautiously. In these cases it is well to carefully weigh the subjective symptoms and the drain of the disease on the system with the probably immediate deleterious effects of the proposed operation. Local anæsthesia may be an important factor in determining this question. In the very aged any form of sinusitis is somewhat of a rarity. This is probably due to the continued reabsorption of the bone causing the antra to become exces-

sively large, and the roominess of the nostrils permitting better aeration. When a maxillary sinusitis, however, becomes established, it is a question whether they should be subjected to the shock of an operation or whether simple expectant treatment is advisable. It would seem that even in bad cases, where in a younger individual no hesitation in operating would be made, simple drainage at the most is as radical a procedure as advisable. These patients rarely suffer much pain, and can get along quite comfortable with more or less of a catarrhal discharge from the nose. Occasional treatment at home will go far towards minimising this condition.

Sex.—A young woman with an occupation is in a far dissimilar position than a young man occupying even a similar calling. A governess or nurse with a chronic discharge from the nose would be an object of disgust and suspicion to the rest of the family, while in a tutor or coachman it would not be so conspicuous, as men are supposed to be subject to more or less catarrh from smoking, etc. The female members of a household seem to be particularly impressed with chronic colds or coughs which afflict any of the individuals who are continually in contact with the children. The fact that they are obliged to regularly visit the doctor contributes not a little to this dissatisfaction. These facts should be carefully considered when dealing with such cases, as few employers object to an operation with apparent cure, while many would not consider keeping an employee around the house that was afflicted with a chronic discharge.

General Condition of Patient.—This may play a very important rôle in deciding the advisability of an operation. If the patient shows much anxiety over his condition, being nervous and depressed, bordering on to periods of melancholia, it is wise to consider means for a rapid cure rather than subjecting him to a prolonged course of treatment, even though the latter gives encouraging signs for an ultimate recovery. The delay may be worse for the patient than the suffering which the operation entails. I shall never forget the patient of Hajek's who was so impressed by the pus that was washed out of her antrum on the first irrigation that she threw herself into the Danube and was drowned.

(5) *Retention, threatened Orbital or Cerebral Complications.*—In symptoms of retention with congestion of face, excessive pain, little discharge, and fever despite daily irrigations, some form of operation is clearly indicated. Here we are practically certain that there

is little hope of an amelioration until drainage and aeration is established, and delay may only further complications.

Threatened extension to the orbit makes an immediate operation imperative, as these cases once established cause permanent changes in the eye, which will follow the individual to the end of his days.

Cerebral complications from the antrum have been singularly fatal, therefore it is wise to anticipate such an eventuality, and at the slightest suspicion of the appearance of symptoms to err if necessary on the safe side by an early and radical external operation.

What form of Operation shall we choose?—This will depend upon many exigencies :

- (1) The ætiology of the disease.
- (2) The chronicity of the disease.
- (3) The tendency and course of the disease.
- (4) The age of the patient.
- (5) The social condition of the patient.
- (6) The physical condition of the patient.

(1) *The origin of the disease* may furnish decided indications for a certain form of operation. If it is of dental origin the diseased tooth and root must be sacrificed, and it is better to enlarge the bony canal into which the root inserted in order to remove the diseased bone tissue, which had been directly around the apex of the root. This procedure is known as the old Cowper method, and the technique is simple. After the tooth is drawn, a pledget of cotton, saturated with a 20 per cent. solution of cocaine in adrenalin, is inserted into the cavity and allowed to remain fifteen minutes. After that time a suitable reamer is used to enlarge the canal and penetrate into the antrum. The opening is kept patulous by means of a suitable appliance (plug), and daily irrigations practised. If the tooth is merely drawn and treatment continued with needle puncture lavage, one runs the risk of continued infection from the diseased bone in the floor of the sinus. That form of operation, which consists in the extraction of several teeth and the installation of a large hole into the antrum, although still practised by some general surgeons, should be abandoned, as it is as unscientific as it is barbarous.

(2) *The Chronicity of the Disease.*—The time given for a sinusitis to become chronic is about four weeks. As a matter of fact, this depends largely upon the virulence of the infection, or the peculiar susceptibility of the individual. In certain cases the disease may continue for many weeks, and remain to all intents and purposes

subacute, *i. e.*, but slight pathological changes have resulted in the mucosa, while in others a few weeks' duration is sufficient to cause changes which are only met with in the most chronic forms. The extent of these changes is in direct ratio to the required extent of the operation. The greater the changes the greater or more radical the operation. If a large area of the antral mucosa has undergone polypoid degeneration it can hardly be expected that complete drainage alone will bring about a cure. Before this can be accomplished it will be necessary to thoroughly remove the diseased tissue by means of the curette in order that the remainder can regenerate, and eventually cover over the defective portions. An incision through the canine fossa, so that the parts can be brought under immediate inspection, will be the only means to this end. Whether the Caldwell-Luc or the Denker method is chosen will depend upon the fancy of the operator. Both are equally effective. The latter is perhaps the easier and the more extensive, but does not give any better results than the former, at least in my hands. There is, however, a slight choice between the two under certain circumstances, which will subsequently be considered.

(3) *The Tendency and Course of the Disease.*—Let us suppose that we had followed out a course of conservative irrigations in a male adult until we were convinced that an operation was necessary to effect a cure. What form shall we choose? If under our irrigations the disease would abate only to continue in its old course after the treatments were suspended, we can take it for granted that something a little more pronounced in the aeration and drainage will bring about the desired result. Obviously a radical operation is not necessary, yet something more than mere cleansing irrigations must be applied. Here the preturbinal method has its greatest indication. It can be done under local anæsthesia; little tissue is sacrificed; the sinus can be fairly well inspected, particularly by the naso-pharyngoscope, topical applications can be made, thorough drainage installed, and the patient hardly incapacitated. The various operations under the inferior turbinate would probably answer in this case, but as they entail sacrifice of more or less turbinal tissue they are now practically discarded. If it were subsequently found necessary to reoperate (this has never occurred after the preturbinal in our hands) a considerable portion of the radical operation has already been done, and it will only be necessary to resect a portion of the canine fossa wall and curette, the nasal opening having already been made.

(4) *The Age of the Patient.*—Fortunately, infants and very

young children are seldom afflicted with purulent sinusitis, due mainly to the absence or partial development of the true sinuses. It must be remembered that in a child one year old, no frontal or sphenoidal exists, while the maxillary is about the size of a bean; the ethmoid labyrinth, however, though small, is fully developed. As ethmoiditis far outshadows other sinusitis in children the problem confronts us as to the form of operation indicated. Unless complications (orbital or external rupture) threaten, or have supervened, the conservative or intra-nasal method is on the whole better, as the cells can be fairly well exenterated with good hope for ultimate recovery. Under a general anæsthetic and a good light a small curette is introduced beneath the middle turbinate, and all cells from the sphenoid anteriorly broken down and removed. After this procedure one finds that the indications for an external operation rapidly diminish, particularly if the patient happens to be a little girl.

Maxillary sinusitis in the young will more frequently require energetic measures, on account of the extreme softness of the surrounding bony structures and their well-known tendency towards osteo-myelitis. If the nostrils are very small, making intra-nasal work both difficult and uncertain, it is better to perform at once a modified Denker, with thorough curettage of the entire antral cavity. The result will often be a rapid and complete cure where temporising with conservative measures will allow the disease to become thoroughly imbedded in the bone, with no ultimate hope of a permanent cure.

Frontal and sphenoid sinusitis *per se* never exist in children as far as our experience teaches.

In the old, extensive radical operations are usually not indicated. As a rule, a recent case of sinusitis in a patient advanced in years is not very severe, due probably to the excessive size of the drainage passages. Should it demand something more than conservative treatment, an intra-nasal operation is usually all that is required. It is not well to subject one of these patients to an extensive operation, not only on account of the general surgical shock, but also because of the enfeebled recuperative powers of the parts themselves. The sensibilities of these old folk are benumbed, and the installation of an opening sufficient for drainage is usually more acceptable to them than the trouble incident to continued treatment, or the discomfort, not to say uncertainty, of a radical operation.

(5) *The Social Condition of the Patient.*—A great deal less can be done in the way of a radical operation on a young lady of some

social standing than, for example, on a maid or waitress, for two reasons. In the first place, in the former if the disease has become chronic it is usually of recent date, as immediate attention was probably given it, and, secondly, she will have more time to devote to subsequent treatment. Most of the female members of the better class prefer far to undergo some form of conservative operation (when an operation is indicated) than to resort to anything radical, even though the after-treatment must necessarily be continued over some length of time. I know of nothing which meets these requirements so thoroughly as the preturbinal operation. Here a conservative operation gives semi-radical results, and at the same time is of little immediate inconvenience to the patient. No great swelling of the cheek, wound in the mouth, and enforced stay in a hospital. For the working class, generally speaking, a Caldwell-Luc or Denker is advisable. These patients can nearly always get off for a few days for hospital purposes, and after the operation little attention is required, as the ultimate cure is but slightly influenced by treatments.

(6) *The Physical Condition of the Patient.*—Chronic invalids suffering with serious internal disorders (kidney, heart, and liver diseases) sometimes acquire antral trouble of operative importance, and a serious question arises as to the procedure to be adopted. It may be that a general shock would be dangerous, and even the discomfort resulting from anæsthesia and hyperæsthesia of the teeth, swelling of the cheek, and a wound in the mouth must be looked upon with some degree of apprehension. Under these circumstances we always have a sheet anchor in local anæsthesia. When the anæsthetic (novocain 2 per cent.) is properly injected, it is astonishing how little pain is experienced, even when the bone is being removed. The preturbinal method, for example, is a totally different proposition under local anæsthesia than under general. The patient does not look upon it with the same degree of apprehension, and the post-operative symptoms do not appear to be so marked. This is probably due to the less extensive degree of traumatism and the greater gentleness exercised with the patient in a state of consciousness. The more radical forms of the Caldwell-Luc and Denker can also be used under local anæsthesia, with comfort to the patient. I recall cases in individuals with pulmonary tuberculosis operated upon under this form of anæsthesia with perfect results, and no subsequent flaring up of the tubercular process.

**PRIMARY TUBERCULOSIS OF THE PHARYNX AND LARYNX
IN A MALE AGED SIXTY-NINE.**

BY JAMES B. HORGAN, M.D.,

Laryngologist to the North Infirmary, Cork.

THE patient, Rev. P. O'H——, consulted me for hoarseness of two months' duration, latterly accompanied by dysphagia. He stated that the symptoms had originated after a period of exacting work necessitating severe exposure, and were accompanied by loss of weight and vigour.

Upon examining the pharynx the right tonsil was seen to be hypertrophied and congested, and presented a septic fissure running in its vertical axis. The lingual tonsils were also slightly enlarged and the whole pharynx was markedly hypersensitive. The ary-tænoids were pear-shaped and œdematous, the aryepiglottic folds were œdematous, as also was the epiglottis, which was swollen to more than twice its normal size, and presented a turban-like appearance. The cords were with difficulty visible in the posterior two-thirds of their extent. They appeared slightly congested, and moved feebly on phonation. The ventricular bands appeared to be but slightly altered in appearance. The right tonsillar lymphatic gland felt hard and sore, and there was some tenderness on pressure over the right side of the larynx. There was no cough or expectoration of any kind. An evening rise of temperature was noted.

I made the provisional diagnosis of tuberculosis of the pharynx and larynx, and referred the patient to his physician to have his chest examined. The latter could find no physical signs of pulmonary disease, and was emphatic in his declaration that it was absent. I accordingly submitted a small portion of the epiglottis and of the right tonsil to the pathologist, whose report stated that the sections made from the tissue of each part showed the lesions to be of a "typically tubercular nature, showing caseous areas and giant cell systems."

As I had every reason for believing the disease to be limited to the pharynx and larynx, and knowing the relatively good prognosis attending laryngeal tuberculosis in the aged, I determined to attempt the removal of the disease in each of the affected parts separately and by radical surgical means. I hoped that by doing so I would at least relieve the patient's great dysphagia. To this end I enucleated the right tonsil under local (cocaine and novocain infiltration) anæsthesia. The operation was well borne, and after

the usual reaction had subsided, he appeared to swallow with less distress. The patient was now sent home to recuperate for a couple of weeks.

When he subsequently reported to me the patient's general condition had disimproved a great deal. Upon examination the larynx showed no appreciable change from the condition above described, though he stated his dysphagia had again increased latterly. The tonsil wound was almost healed, and looked healthy. The patient was now suffering from purpura hæmorrhagica, chiefly evident on his lower extremities.

From this period up to his death, two weeks later, the patient's condition rapidly went from bad to worse. The general asthenia, combined with the rapid spread of the purpuric eruption, compelled me to forego amputating the epiglottis, which, following the example of Hett, I have found to be a valuable means of relieving the dysphagia in such cases. Other remedies, including an attempt to anæsthetise the superior laryngeal nerves by alcoholic injection of β -eucaine (Grant), were powerless to relieve this symptom, which was so severe that nasal tube-feeding had finally to be resorted to. I attributed the patient's death directly to the starvation enforced by this symptom.

Apart from the shortness of the illness, which had lasted little more than three months, if dated from the onset of symptoms, this case is interesting because of the entire absence of pulmonary symptoms, even up to the patient's death, and the unusual combination of tubercnlosis of the larynx and the tonsil. StClair Thomson is of opinion that laryngeal tubercnlosis is met with in its less characteristic forms in the aged, whilst Moure states that in these cases it runs a very rapid course, both of which facts are well corroborated by the above case.

COLUMNAR CARCINOMA OF THE ETHMOID; OPERATION AND CURE.

BY JAMES B. HORGAN, M.B.,
Laryngologist to the North Infirmary, Cork.

H. T.—, aged twenty-nine, consulted me on July 10, 1912, for nasal obstruction and excessive purulent discharge from the right nostril of twelve months' duration. Proof puncture revealed the existence of a chronic empyema of the right antrum, and the coincident exist-

ence of suppurative ethmoiditis was established by the reappearance of pus in the infundibulum when the patient was examined some hours later.

On July 15, I performed Denker's modification of the Luc-Caldwell operation on the right antrum, the lining mucous membrane of which was entirely removed, and totally exenterated the right ethmoidal labyrinth which was found to be diseased *in extenso*. All this was done under morphia, cocaine, and novocain infiltration anaesthesia without unduly distressing the patient. I next saw the patient on August 18, when the nose appeared dry and much healthier, he stated that the discharge had almost ceased and that the nose felt free and comfortable. I removed a couple of small polypoid tags from upper part of the right nostril. Next seen on September 23, all signs of active suppuration were absent, and apart from some slight crusting in the previously diseased area, the disease was apparently cured.

I did not see the patient again until December 20 of the same year, when he complained to me that the right nostril had again become quite blocked, that latterly he had been getting headaches and had had a bad attack of epistaxis lasting two hours. Upon examination I was surprised at the remarkable appearance presented by his right nostril, which was entirely filled by a fungating mass, which bled readily on probing. A suspicion of malignancy was aroused, both by the appearance of the growth and the history of headaches and epistaxis. The pathologist's report read "typical columnar-celled carcinoma."

On January 5, under general anaesthesia, and having previously plugged the naso-pharynx, I approached the right ethmoidal region by the external incision suggested by Moure. Ample opportunity was given me by this means to reach the growth in all its ramifications. The latter extended upwards to the cribriform plate and externally to the *lamina papyracea*. Haemorrhage was very brisk during operation, but was subsequently easily controlled by a gauze plug, which was removed about twelve hours later. The patient made an uninterrupted recovery, and has since remained free from any recurrence, a fact which the writer has been able to verify by seeing him at intervals.

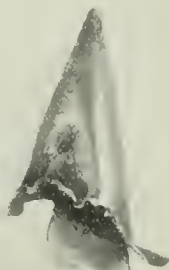
The points of interest in this case are the age of the patient, the rapid perversion of what the writer feels sure was, in the first instance, an ordinary suppurative ethmoiditis into a tumour formation of high malignancy, and the comparative ease with which even a highly malignant intra-nasal tumour may be totally eradicated, provided it has not yet exceeded the bony frontiers of the nose or its sinuses.

CLINICAL NOTE.

BULLET WOUND ON THE NOSE.

BY W. FRANK WILSON, M.B.,
Capt. R.A.M.C. (T.F.) 1st Northern Gen. Hosp.

THE following report of a case admitted to the Throat and Ear Department of the 1st Northern General Hospital, Newcastle-on-Tyne, may perhaps be of some interest :



Bullet casing taken from nose.

The patient, a private in the Northumberland Fusiliers, presented himself at Out-Patients with the following story :

He was wounded near Ypres in April, when occupying some advanced trenches in close contact with the enemy, who was only 80 yards away.

He was knocked out by a bullet which hit him on the bridge of the nose on the left side, and eventually found himself in a base hospital in Boulogne, where an operation was performed and the wound sutured.

After a few days, he was sent home on sick furlough to Newcastle, and, while at home, he noticed that there was a "smelly discharge of matter from one side—the left—of his nose." Because of this he reported himself at the military hospital for treatment. He was referred to me, and, on hearing the typical story of foreign body, I suggested that he still had the bullet in his nose. He laughed at the very idea, and promised to present me with it if I succeeded in producing one from his nose, which was promising a good deal, as "Tommy" treasures nothing so much as these mementos of his "scrap."

On examining the nose, swollen, boggy mucous membrane obstructed any view beyond the anterior end of the lower turbinal of the left side. After swabbing out with a 10 per cent. solution of cocaine, however, and

using a fine-bladed Killian speculum, the thin, jagged edge of a piece of metal could be seen and felt lying across the upper part of the nose at the level of the middle turbinal body. One end of it was imbedded in the middle turbinal, and the other transfixing the septum, without, as far as could be seen, actually perforating the mucosa of the right side. By gentle manipulation and compression of the expanded portion of the piece of metal, it was easily removed without more damage to the nasal mucosa, and it turned out to be the empty casing of a rifle bullet, which, fortunately for the man whom it struck, had left the lead behind before it hit him.

The explanation seems to be that the bullet kicked off a sandbag parapet which existed on the intervening ground between the opposed trenches, the impact separating the lead from the casing, the photograph bearing this out, as it shows the nickel casing to be much damaged about its base. The casing being of comparatively light weight and its velocity much diminished, it got no further than the interior of the nose after fracturing the nasal bone and nasal process of the left superior maxillary. It lay point upwards, the expanded end downwards, and would have defied any attempt at blind removal, which procedure would certainly have been attended by considerable damage to both septum and outer wall of nose.

SOCIETIES' PROCEEDINGS.

THE AMERICAN LARYNGOLOGICAL, RHINOLOGICAL, AND OTOLOGICAL SOCIETY.

May, 1914.

(Continued from vol. xxx, p. 506.)

Tuberculosis of the Middle Ear.—H. H. Briggs (Asheville).—The frequency of tuberculosis of the middle ear in persons suffering from tuberculosis elsewhere in the body has been placed at 25 per cent. Of 1500 school children examined by Westmacott, 2 per cent. were found to have tuberculosis of the middle ear. The disease is probably of far greater frequency than statistics show, and the true diagnosis is often mistaken because its onset is so insidious that attention is not easily called to the condition, and no observation is made. Moreover, when the case presents itself the condition usually has passed from that of a pure tuberculous process and become a mixed infection, the symptoms of the suppurative condition masking the true nature of the initial disease. The careless manner of classifying all discharging ears as suppurative otitis media, without recourse to the microscope or inoculation tests, is unfortunate.

The middle ear must be regarded as belonging anatomically and bacteriologically to the upper respiratory tract, as insisted upon by Goldstein, who considers primary tuberculous infection of the middle ear of respiratory origin.

Among the predisposing factors may be classed general debilitating diseases, the hereditary influence of tuberculosis, syphilis, association

with tuberculous individuals, unhygienic environment, overcrowding, poor food, cachexia; in short, any condition of surroundings or constitution which induces a lowering of the systemic power to combat infection. Among the predisposing causes of more immediate influence may be regarded (1) the existence of a tuberculous lesion elsewhere in the body, especially pulmonary tuberculosis with cavitation, and tuberculous disease of the glandular system; (2) abnormal conditions of the upper respiratory tract, including the presence of naso-pharyngeal adenoid growths, which have been shown by microscopic examination and inoculation tests to be the frequent seat of a latent tuberculosis; (3) infancy and childhood offer a predisposition for various reasons.

The channels of infection are: (1) Mechanical, through the Eustachian tube, either air-borne or introduced into the tympanic cavity by the aid of particles of mucus or foreign matter during the acts of swallowing, coughing, sneezing, or blowing the nose. (2) Infection along the Eustachian tube by other than mechanical means. (3) Through the blood-channels. (4) Through the lymphatics. (5) *Via* the external auditory canal. (6) By extension of an intracranial infection through the internal auditory canal, Fallopian canal or the labyrinth. This is mentioned as merely a possibility.

To the author the mechanical theory of infection, especially secondary, seems simplest, easiest, and most probable in the great majority of cases. The great number of cases occur in early childhood and advanced phthisis, when the conditions favourable to the mechanical passage of infectious material through the Eustachian tube are at their maximum.

Clinically, two rather distinct forms of tuberculosis of the middle ear manifest themselves—acute and chronic. In each may be found all the changes, from slight infiltration of the mucous membrane to extensive necrosis of the temporal bone. Rapid loss of tissue is characteristic of the acute form, resulting from ulceration of the tubercles throughout the mucosa. In the chronic form the process runs an asthenic course, and infiltration, caseation, and necrosis follow less rapidly and with more characteristic tuberculous sequence.

The essential symptom which differentiates tuberculous otitis from other forms is the absence of pain. Even though the destructive process is rapid and the appearance of the *membrana per se* simulates an acute purulent otitis there is seldom any complaint of pain.

In determining the diagnosis, the family history should be carefully considered with regard to tuberculosis, and the patient's habits, residence, and environment should be ascertained to determine whether there has been an undue exposure to tuberculous persons or unhygienic surroundings. Facial paralysis, especially in children, occurs in one-third of the cases, against 1 to 2 per cent. in non-tuberculous conditions, and is of special diagnostic significance. The sanious and foul condition of the discharge, especially when particles of bone are incorporated, excites suspicion. Marked impairment of hearing, absence of headache, occurrence of hæmorrhage, are considered by some as diagnostic points. Tuberculin injections and blood-pressure changes are also considered. The only positive means of diagnosis, however, are: (1) Finding microscopically in the discharge or granulations the tubercle bacillus, or (2) giant and epitheloid cells and caseation in the tissue; (3) by experimental inoculation, reproducing tuberculosis.

The prognosis is, as a rule, unfavourable.

The treatment naturally divides itself into hygienic, dietetic, medical, and surgical, as the case indicates. The use of tuberculin has proved so

successful in so many forms of tuberculosis that no tuberculous process in any way localised can be considered invariably to contra-indicate its use. The author could see no reason why it should not be indicated and of decided value in properly selected cases of tuberculosis of the middle ear.

FRANK R. SPENCER mentioned a method of making the diagnosis of tuberculosis of the middle ear, consisting of cleansing the canal first, introducing an aspirator which he had brought from Berlin, aspirating, and injecting the pus into a guinea-pig. The pus, when aspirated, might not show tubercle bacilli, but the organisms could be positively demonstrated after the injection into the guinea-pig by the examination of the animal's organs several weeks later.

Corrective Rhinoplasty.—**Lee Cohen** (Baltimore).—Where the nose has been partially or completely destroyed by disease or trauma, the individual so disfigured is not only an object of pity, but is not accorded the privileges in the social and commercial world enjoyed by other persons. Since the appearance of Tagliacozzi's work, in A.D. 1597, rhinoplasty for the relief of such conditions has been an accepted surgical procedure. For some reason, however, corrective rhinoplasty has not received the attention which it merits. Rhinologists in general have shown but little inclination to develop this line of surgery, although the feasibility and advisability of the work have been proved by the excellent results obtained by Roe, Joseph, Berens, and others for a number of years past. This indifference may be due to the fact that there has been absolutely no systematic treatise on this work until the appearance of Joseph's article in the "German Handbuch" about a year ago. An operator, however clever, might lack sufficient originality to develop a proper technique along these lines, in the absence of such literature.

Previous to the appearance of Roe's publications only methods calling for skin incisions were described as applicable to external nasal deformities. Credit should always be given to Roe as the originator of the subcutaneous method.

The deformities considered are divided into two classes: (1) idiopathic or congenital; (2) acquired. To the former belong the over-developed nose, hump nose, congenital saddle and pug nose, while to the latter belong all sorts of grotesque alterations in shape and position of the nose caused by fracture or dislocation, and by destruction of the bony or cartilaginous framework from syphilis, tuberculosis, and lupus. For practical purposes a further subdivision is generally made into deformities affecting the bony and those affecting the cartilaginous portions, although both are frequently involved at the same time. The various types of deformity have been admirably described by Roe, whose classification seems the most comprehensive.

In all methods of correcting these deformities the main object should be to avoid marring the subsequent appearance of the nose by scar, or, in other words, to work entirely from within. From these subcutaneous operations incisions, as first advocated by Roe, should be made within the vestibule of the nose, generally above the lower lateral cartilage of the left side, and subsequently, if necessary, on the right side, cutting through the mucous membrane and the cartilage to the under surface of the skin. Whether this incision is made close to the septum or more laterally depends on whether it is desired to alter the line of the nasal dorsum only, or whether the nasal processes are to be severed from their attachment to the superior maxillary. It is surprising to see with what ease one can, with a very small straight knife, undermine the skin over

the entire nose through a small incision on one side, owing, of course, to the flexibility of the cartilaginous portion. By following the course of the knife under the skin with the index finger on the outside it is not difficult to avoid injury to the skin. The skin having been undermined, one proceeds with the subsequent steps of the operation, working under the skin as if it were a tent, and guiding the movements of the various instruments with the left hand over the outside of the nose. The technique for the correction of the various conditions named is given in detail, and a number of cases reported.

Dr. JOHN O. ROE (Rochester) said that Dr. Cohen's paper was a verification of the old saying that "imitation is the sincerest flattery," and protested that he had originated the procedures described.

Dr. COHEN said he had no intention, in his references to Dr. Roe's work, of detracting therefrom. He insisted, however, that there was no systematic description of this work prior to that mentioned in the paper. He had operated upon about ten cases before he ever saw Dr. Roe operate.

The Efficacy of Vaccines in the Treatment of Chronic Diphtheria Carriers.—Arthur I. Weil (New Orleans).—The occasional persistence of the Klebs-Loeffler bacillus in the throats and noses of patients for weeks and sometimes months after their complete clinical recovery has been a source of annoyance and concern to everyone who has had to deal with diphtheria patients. The necessity for complete isolation of such patients as long as the organisms in virulent form are present, self-evident though it is, entails a serious loss of time, and inconvenience to the patient. This is true of not only those carriers who have just recovered from an active diphtheria, but likewise of that other class in whom, though they have never had an active diphtheria, nevertheless, either through contact with diphtheria patients or otherwise, the Klebs-Loeffler bacilli are present. The necessity for isolation is just as great, and the presence of the germ just as persistent, as in those who have actually suffered from the disease.

It is the eradication of the diphtheria bacilli from the nose, throat, and ears of both classes of carriers, and the resultant stamping out of a diphtheria epidemic in a public institution—an orphan asylum—that forms the basis of this communication.

After a year or more of sporadic outbreak of the disease, constantly recurring in spite of the most careful isolation of the diphtheria patients, twenty-four cases finally remained in the isolation wards of the infirmary in which all the active cases had been treated. The patients were classified in three groups: (1) Those who, having had an active diphtheria infection, had been clinically well for a period of two weeks or longer, but in whom live diphtheria bacilli were still found in the cultures. The period during which a positive culture had persisted after complete clinical recovery varied from three months to something over two weeks. There were nine of these patients, who were considered *chronic active carriers*. (2) Those in whom, though they have never had an active diphtheria, the culture showed the presence of diphtheria bacilli. It is impossible to know just how long they had been carriers, since the bacilli were found in routine examinations of all children in the institution. There were twelve of these, and they were considered *chronic passive carriers*. (3) Those who had an active diphtheria infection, but in whom less than two weeks had passed from the time of their complete recovery to the beginning of the vaccine treatment. This group comprises three patients who are called *active carriers*. Of the three active carriers

comprising group 3, in one case ten days and in the other two about nine months elapsed between their complete clinical cure and the last positive culture. The cases, however, are too few to allow any definite conclusions to be drawn.

In drawing conclusions as to the value of the vaccine treatment in the twenty-one chronic carriers, the possibility must not be lost sight of that many, if not all, might have cleared up without the use of vaccines. In view of the fact, however, that practically all the cases showed a marked diminution in the number of bacilli present shortly after the treatment was begun, and that all of them eventually did clear up with large doses, the belief would seem to be justified that the vaccines are of some value. At any rate it has been shown that large doses of diphtheria vaccines can be used without the slightest inconvenience to the patient. From the author's experience, large doses give better results than smaller ones. Whether autogenous or stock vaccines are the more useful is a matter of opinion.

THE OTO-LARYNGOLOGICAL ASSOCIATION OF NORWAY.

Christiania, October 17, 1912, and April 28, 1913.

Report by Prof. UCHERMANN.

Actinomycosis.—Wetterstad demonstrated two cases of actinomycosis. In the first, a boy, aged nine, on his admission into hospital pus was found in the right auditory meatus with, on the anterior wall, a granulation protuberance of the size of a pea. On the right cheek there were two abscesses of the size of a Spanish nut. When pressed, yellow matter flowed out of the auditory passage through the said granulation. Actinomycotic granules were found in the matter. Healing followed scraping and treatment with potassium iodide.

The other patient, a countryman, aged fifty-four, noticed pain, when swallowing, in his throat—on the right side—and some dyspnoea. After three weeks the abscess in the throat broke, and the trouble ceased. At the same time the patient observed a lump on the outside of his throat under the right angle of the jaw. This lump steadily increased in size. On admission, there was a red thickening of the skin between the right angle of the maxilla and the sternum, as hard as wood, on some points rather prominent, and here there was soft infiltration. In the pharynx, near the root of the tongue on the right side, a red infiltration was seen, turning the epiglottis towards the left. The soft parts were incised and scraped. Here also actinomycosis was demonstrated. Upon treatment with potassium iodide in increasing doses, only a small infiltration, of the size of a walnut, remained, in which no actinomycotic grains were traceable. Continuous treatment with potassium iodide.

A third case, a grown-up girl, was treated in the hospital for the same disease. The illness began with a swelling in the right cheek, and the patient was admitted with a diagnosis of possible malignant tumour.

All the patients were from the country; all had carious teeth. Upon microscopical examination of one patient's teeth, however, nothing abnormal was found.

Suppurating Thyro-Glossal Cyst.—Uchermann demonstrated the case of a woman, aged thirty-five, who was admitted to hospital with an abscess in the middle line of the neck. The abscess extended from hyoid bone to the sternum, and communicated, in the middle line of the tongue, with the cavity of the mouth, from which pus was expectorated. The abscess was said to have begun ten days previously, just above pomum Adami, with rigors and fever. From there it expanded upwards and downwards. At the same time, difficulty in swallowing, but not in breathing, supervened. Eight days later the abscess broke. When the patient was admitted, the portion near the root of the tongue was considerably reddened and swollen; matter appeared in the middle line from a certain spot (foramen cæcum?). Upon incision above the thyroid cartilage, $\frac{1}{4}$ litre of pus was discharged. The patient left cured. The extraordinary course of the abscess seemed to indicate a starting-point near the pyramidal process of the thyroid gland, with further breaking through to the cavity of the mouth along or through a thyro-glossal duct, which was, perhaps, partly open. Attempts to introduce a probe did not succeed. By laryngoscopy, no opening could be seen.

Labyrinthitis.—Uchermann demonstrated the cases of two boys, aged ten, presenting on admission more or less distinct symptoms of "labyrinthismus," combined in the one case with an acute otitis media suppurativa, in the other case with a chronic one. The acute case had begun three weeks previously as an otitis media purulenta (after angina), which disappeared a week after paracentesis. Ten days later—four days before admission—the patient grew so giddy that he had to go to bed; subsequently he had been confined to his bed, and vomited once or twice daily. A repetition of paracentesis gave no pus. No fever. When admitted, the patient could hear with the right ear the whisper at 3 metres; the left ear was normal. Rinne -10, Schwabach +10. The posterior half of the drum-membrane was somewhat injected; no perforation. Pulse, 88; temperature, 37.6° C. There was rotatory and horizontal nystagmus to the right. The patient was giddy; could not walk or stand alone; fell in the direction of the quick eye movement. The caloric test gave normal reaction. Otherwise nothing abnormal. By treatment with pilocarpine and rest in bed the nystagmus and the giddiness disappeared in eight days, and the patient was discharged after further pilocarpine treatment for eight days. The patient could then hear the whisper at 5 metres. Rinne +25, Schwabach +5.

In the second case, on admission, there was in the left ear an otitis media purulenta of two years' duration. The patient could hear the whisper at $\frac{1}{2}$ metre. Rinne ÷20, Schwabach ÷20. A perforation of the size of a pea in the postero-superior quadrant. On the right side also the hearing was reduced (5 metres). No perforation. Rinne +25, Schwabach +7. The patient had been brought to hospital because of some tenderness above the left mastoid process. There was brisk, horizontal nystagmus to the left, less pronounced to the right. No giddiness. By caloric test (27° C.) in the right ear nystagmus was seen to the opposite side, not to the same side. Upon test on the left (the affected) side, nystagmus. A week later the ear was dry. The nystagmus was somewhat less; strongest to the right, possibly somewhat less pronounced than before. Otherwise the patient was well. The hearing had improved, so that he could hear the whisper at 6 metres on both sides. The case is interesting because of the total absence of giddiness and dis-

turbances of movement, in spite of the marked nystagmus. The latter was most likely of old date.

General Tuberculosis simulating Otogenic Intracranial Complication.—Uchermann.—Subacute otitis media purulenta of two months' duration in a workman, apparently strong, who had been admitted because of giddiness and vomiting during the previous six days. Violent headache with remissions. Normal temperature. The hearing was reduced to 20 cm. in the ear mentioned. Rinne — 20, Schwabach — 10. In the auditory meatus some greyish-yellow matter. A perforation of the size of a pin's head in the drum-membrane in front. Mastoid process normal. Pulse, 112; temperature, 37.20° C. There was nystagmus to the right looking. Romberg —. The following day the patient was better. He had feelings of giddiness only when moving in bed. Nystagmus slight to both sides. No vomiting. Pilocarpine, 0.01 grm. daily. Six days later vomiting. No evacuations for a week. Four days later the hearing was found to be unchanged; but Schwabach + 15 instead of — as before. Violent headaches that impeded the examination. Giddiness and nystagmus had decreased. The middle ear was nearly dry. No vomiting. Eight days later the patient complained of seeing badly. Temperature and pulse normal all the time. Vomiting in the evening of the last few days. On ophthalmoscopic examination, considerable papillædema on both sides was demonstrated. Pilocarpine, potassium iodide. On partial mastoid resection, some pus was found in the antrum; elsewhere nothing. Dura and sinus were normal. Five days later the wound cavity was clean. The patient now could see hardly anything. No nystagmus. Not particularly giddy. Pains in the crown and back of head. Abducens paresis on the right (the healthy) side. Four days later temperature 38–37.5° C. Total resection was now undertaken, and granulations in the epitympanic recess. Upon opening the dura above the tegmen tympani, clear serum ran out. On further opening, cerebral matter emerged. On puncture of the same, nothing was obtained. Wassermann, —. After the operation the patient was fairly well. No vomiting; no headache; normal temperature; but totally blind. The prolapsus increased somewhat. A few days later the posterior brain cavity was examined on the left side for possible tumour. Nothing was found. The wound was sewn up. On September 13 paresis of the left levator palpebræ superioris supervened, and later the left eye was found to be ophthalmoplegic. Otherwise the condition was unchanged. Still later, involuntary urination and evacuation with increasing stupor. September 27, death.

At the *post-mortem*, recent miliary tuberculosis was found in the lungs, the spleen, and the kidneys. In the cerebrum some blood, with scattered miliary tubercles in the cerebral membranes. No jelly-like coating; no tuberculous meningitis. In the cerebral matter itself numerous scattered solitary tubercles, both in the great and the small brain, of the size of a pea up to a bean; some in the vermis of a greater size. One single example, of the size of a pea, in the pons just under the aqueæ ductus. Several, of the size of a pea, in the central ganglia, especially in front in thalamus opticus. In the ear itself no tuberculosis could be discovered.

Naso-Pharyngeal Fibroma.—Uchermann demonstrated the case of a workman, aged nineteen, who, April 3, had been operated upon for a retro-nasal fibroma issuing from the anterior aspect of the body

of the sphenoid. It filled the posterior part of the right nasal cavity and the right sphenoidal sinus, the external bony lateral wall of which was missing, so that the sinus cavernosus on this side lay bare. The convex inferior border of the tumour projected, as an excrescence the size of an almond, into the fornix. In the adjacent ethmoidal cells there was polypoid tissue and œdematous mucous membrane. The tumour was very hyperæmic (microscopical diagnosis: angio-fibroma). Operation *à la* Denker. This is the seventh case of fibroma sphenoidale that has occurred in the hospital during the last two years, all having been operated by the naso-maxillary route, and with successful results. The patient had been admitted for epistaxis, the obstruction of the right half of the nose having been observed five months before.

Foreign Body in Bronchus referred to Œsophagus.—Ucher-mann demonstrated the case of a common iron carpet-tack that had been removed from the left bronchus of a girl aged six. According to the anamnesis, her brother, aged five, had put "a stone of a dried plum" in her mouth. A physician had treated her with emetics without success. Upon Röntgen examination "the stone" turned out to be a carpet-tack, the point turning upwards and the head to the left on a level with the fifth dorsal vertebra and localised in the œsophagus. As by œsophagoscopy no foreign body could be found in the gullet, the patient was subjected to renewed skiagraphy, and the tack was then localised in the right bronchus. After upper bronchoscopy proved ineffectual (the larynx being extraordinarily narrow and the tube too large), a high tracheotomy was undertaken, and two days later inferior bronchoscopy under local anæsthesia. The foreign body was seen in the right bronchus, and caught by means of Patterson's small forceps. But when about to be conducted through the tracheal opening, the hold slipped. The foreign body disappeared, and could not be found again. The same thing happened, strange to say, at the next examination two days later. The same instrument was used. The foreign body lay again in the right bronchus; but after the subsequent Röntgen examination, it was found in the left bronchus. It was removed therefrom with a broader forceps (Guisez). In the meantime the mucous membrane had been injured by the larger Patterson forceps, and emphysema had supervened over neck and arms. It caused a rise in temperature, which, however, went down after a few days. The child was discharged cured. The report shows that by Röntgen examination for foreign bodies in the chest it is always necessary to undertake the examination in two planes, with a view to avoiding an erroneous projection.

Prevention of Hæmorrhage after Posterior Turbinotomy.—Heidenreich mentioned a method for preventing after-bleeding in removing hypertrophic posterior ends of the inferior turbinals. A galvano-caustic furrow is made upwards and downwards laterally in the part that is to be removed. This is followed by slow strangling with a cold snare, and finally the galvano-cautery on the whole surface of the wound.

PROFESSOR UCHERMANN, when the posterior ends have been removed by the snare (after strangling for some minutes), generally cauterizes at once with chromic acid, sometimes also with the galvano-cautery.

Anomalies of Voice.—Heidenreich described the anomalies of voice resulting from abnormal voice-breaking. These anomalies are functional without demonstrable morbid changes in the larynx and

trachea, and are found especially in men of all ages after the age of puberty ("persistent fistula-voice"). If the voice is too high (eunuch-, fistula-, or falsetto-voice), or if it is "ueberschnappend"—that is, springing momentarily and involuntarily from the normal chest-register to the falsetto-voice—Bresgen let the patient recite loudly, slowly, and distinctly, pressing at the same time with his thumb on the patient's larynx on a level with pomum Adami in a direction straight backwards. Schech, with the point of his index in the incisura thyreoideæ superior, pressed the patient's larynx downwards, the chin being lowered towards sternum. By this pressure the crico-thyreoidei muscles and the vocal cords are relaxed, the voice grows deep, and the forming of the fistula-voice (which is due to too strong contraction of crico-thyreoidei and the vocal cords) is rendered impossible.

As a rule, one succeeds in the first sitting in five to ten minutes by this simple manipulation in procuring a permanently normal voice to the patient with the often unhappy and depressing fistula-voice (patients at the age of eighteen to fifty).

If the voice is too deep—which occurs very rarely—Bresgen pressed together with his thumb and his index finger both the thyroid plates. Schech pressed with his thumb from the inferior border of the thyroid cartilage the larynx upwards, the patient stretching his neck and raising his chin. The voice then grows higher, the crico-thyreoidei and the vocal cords being strongly extended.

PROFESSOR UCHERMANN had occasionally used this grasp, but only as an introduction to methodical exercises in singing and speaking in deep tones. He could hardly conceive of a lasting effect without such exercises following, especially in old cases.

Abstracts.

PHARYNX.

Closier, L.—**Ulceration of Pharynx in Diphtheria.** "Proceeds. Paris Soc. of Laryngol., Otol., and Rhinol." December 9, 1911.

The patient, aged twenty, who, after a severe attack of diphtheria, which commenced in the nasal fossæ and extended to the bronchi, presented a perforation of the septum and loss of substance of the left border of the epiglottis; the latter was bound down by cicatricial adhesions to the lateral wall of the pharynx. Wassermann's reaction was negative.

H. Clayton Fox.

Cornet, P.—**Large Adenoma of the Superior Surface of the Soft Palate undergoing Epitheliomatous Degeneration. Extirpation.** "Proceeds. Paris Soc. of Laryngol., Otol., and Rhinol.," December 9, 1911.

The growth was removed from a woman, aged twenty-seven, in June, 1910. The history of this tumour presents some interesting features from clinical, anatomical, and operative points of view.

On May 31, 1910, the patient related the following history: During a violent fit of coughing, accompanied by nausea, a large fleshy mass suddenly appeared in the mouth. The coughing subsided, and the mass returned into the throat; but since then the patient was continually

troubled by nausea, and each time the growth projected into the buccal cavity. The patient had enjoyed excellent health up to the present. For nine or ten months, however, she had breathed badly by the nose, but the obstruction had never seriously troubled her. She also expectorated a little blood in the morning. Examination of the oro-pharynx showed the presence of a large tumour which hung behind the free border of the soft palate. It was irregularly rounded, multilobate, cauliflower-like, and in colour raspberry-red. In width it extended from the right posterior pillar to half the distance separating the uvula from the left posterior pillar. Vertically it extended downwards to the base of the tongue. It was firm in consistence, and did not bleed when touched. If nausea were induced, the growth became evaginated from the naso-pharynx and swinging from behind forwards, was propelled into the mouth. During this movement it kept the soft palate in the position which obtains by using a palate retractor (Moritz Schmidt's).

Digital examination of the cavum showed that the tumour rested on the right half of the palate. The left side of the naso-pharynx was free. On passing the finger to the left of the tumour, one came upon the left choana without encountering any obstacle. In front the growth did not reach the right choana; a space the width of the index-finger intervened. Above it touched the vault of the pharynx, but only behind. Its anterior extremity scarcely reached as high as the posterior extremity of the inferior turbinated body. It was inserted by its anterior extremity on a small area of the velum to the right of the median line, behind the choana, almost as high as the tubal orifice. The growth had developed in the naso-pharynx, and attained to the size of a small hen's egg without the patient noticing it and without causing any nasal obstruction. The reason being, that in retro-nasal obstruction the size of the obstructing mass is not everything. The position occupied by the mass is a factor no less important. It is a daily observation that it is not the largest mass of adenoids which always determines the greatest obstruction to respiration. Small vegetations, but implanted around the choanæ, obstruct the nose much more completely than a large mass placed a little behind the nasal fossæ. In the case of this patient, it is probable that the tumour before prolapsing into the oro-pharynx was more or less fixed behind the right choana, and that the left half of the cavum was unobstructed. Thus the nasal obstruction was unilateral, and with unilateral obstruction breathing is easily effected. Provided that the unobstructed nasal fossa be free, the amount of air inspired through a nasal fossa of normal patency suffices to assure hæmatosis.

According to the histological diagnosis, the tumour was an adenoma in a state of epitheliomatous degeneration. In most cases of palatine adenomata the growths originate on the anterior surface of that structure, and are consequently buccal tumours. Here, on the contrary, the adenoma was implanted on the superior surface, and had evolved in the cavum. On the other hand, the great majority of naso-pharyngeal tumours, fibromata, fibro-myxomatous polypi, cysts, etc., have their starting-point in the sphenoid or the posterior portion of the ethmoid.

The removal of the growth was effected through the mouth without difficulty. The nature of the tumour was discovered on histological examination.

H. Clayton Fox.

NOSE.

Milligan, Sir Wm.—Rhinophyma: its Etiology, Pathology, and Treatment. "Lancet," September 18, 1915, p. 643.

Describes a case. It is difficult to assign a cause to the condition. A relationship to chronic alcoholism has not been definitely proved; but it presents a marked similarity to aggravated "acne rosacea." Pathologically there is marked thickening of the connective tissue of the corium, with hyperplasia and cystic dilatation of its sebaceous glands, and small deposits of fat between the various hypertrophied areas. The best treatment is to remove by careful dissection, followed by primary skin grafting.

MacLeod Yearsley.

Wray, Charles.—Bony Growth in Frontal Sinus. "Proceedings of Royal Society of Medicine," Section of Ophthalmology, p. 126.

The exhibitor said that bony tumours generally began in the frontal sinus, and if a skiagram were taken of the specimen now shown it would be very apparent. The growth was the size of a bean. The peculiarity of the growth was that on one side it was hollow and entered into the nose. It did not present in the orbit.

The exhibitor said that he would not call his case one of osteoma. He thought the explanation was that the patient had had a chronic inflammation of the sinus, and it had led to a considerable thickening of bone, so that in some places it had reached a diameter of $\frac{1}{4}$ in.

The condition was only discovered *post-mortem*. *Archer Ryland.*

LARYNX AND TRACHEA.

Riddel, D. F.—Complete Occlusion of the Trachea due to Injury to the Cricoid Cartilage after Intubation and Tracheotomy—Operation and Recovery. "Brit. Journ. of Children's Diseases," No. 131, vol. xi, November, 1914.

The case record of a boy aged two and a half years admitted to hospital suffering from diphtheria. The implication of the larynx necessitated intubation, and finally, owing to the failure of the latter, a hurried tracheotomy, in which the cricoid was divided. As this subsequently led to complete stenosis of the larynx, and rendered re-intubation impossible, a low tracheotomy was performed, and the trachea then reopened at the site of the old tracheotomy wound. A dense cartilaginous mass was found at the level of the cricoid, which completely closed the lumen of the trachea. This mass, which appeared to be partly collapsed cricoid and partly new growth, was divided by two cross incisions, and a portion removed from the centre. The external wound was then sutured and the child intubated, the tracheotomy tube being left in. The latter was removed five days later, but the intubation tube was not finally dispensed with until seven months had elapsed.

When discharged, the child was well and strong, voice slightly husky but strong, and stridor only present to a slight extent when the child got excited. The use of the intubation tube after the operation was purely mechanical, and served to prevent collapse of the trachea and keep the stricture patent. In the later stages it served to dilate the latter.

J. B. Horgan.

EAR.

Closier, L.—Bilateral Deafness after "606." "Proceeds. Paris Soc. of Laryngol., Otol., and Rhinol.," December 9, 1911.

On October 9, 1911, a man aged forty-one presented himself at St. Joseph's Hospital complaining of deafness which supervened after the injection of "606." Nothing was found of interest in the history from an aural point of view. During his military service in Senegal he had suffered slight attacks of malarial fever, and since his return to France he had suffered every year at the same periods—May, July, and August. In July, 1910, he had a chancre, which he treated himself with boric acid lotion and applications of powdered calomel. Having a slight attack of fever, he entered hospital in May, 1911. There the surgeon noticed the syphilitic lesion, and, after disappearance of the fever, administered five injections of "606" in five days. Unfortunately, the dose was not discovered. Two or three days after the last injection the patient found that his hearing was failing. This loss of power was progressive, and especially on the left side. Now the patient complained of total deafness on the left side and very marked diminution of auditory acuity on the right side. At the onset he had marked tinnitus of the left ear; but it is now more intense on the right. He is sometimes seized with sudden crises of tinnitus whilst at work; his vision is affected; he sees objects revolve, and there is a tendency to be carried towards the right side. The patient likewise complained of progressive failure of vision; but an ophthalmoscopic examination did not reveal any lesion of the fundus; the troubles were the result of hypermetropia.

Examination of the ears and the auditory and equilibratory functions gave us the following results:

Right Ear.		Left Ear.
White, slightly } retracted, mobile. }	Membrane {	White, slightly retracted, mobile. }
←	Weber	
+	Rinné	False Negative Rinné.
8"	Schwabach (128° d.v.)	0
0.10 m.	Whispered voice.	0
0.70 m.	Loud voice.	0

The test of walking with a smart turn about at the word of command induced vertigo and very decided staggering when the patient turned round to the right side.

Romberg's test and those of Von Stein were positive. Spontaneous nystagmus in both directions; but the twitches were more rapid and accentuated when the eyes were directed towards the left side. Injection of cold water (20° C.) into the left auditory meatus induced no change in the spontaneous nystagmus, neither did it occasion vertigo. By treating the right meatus in a similar manner, vertigo was only induced after two and a half minutes. The patient entered hospital. An injection of Hyd. Biniodid was administered daily for fifteen days. Fresh examination October 25. The patient now heard conversation easily; there was no necessity to shout. He heard whispering at 1 m. on the right side, and at 0.05 m. on the left side. But it was easy to satisfy oneself that the voice was only heard in the right ear.

Lucæ-Dennerts' test demonstrated that auditory perception was absent on the left side. Moreover, Weber's test was lateralised to the

right, and Bárány's deafener showed a false negative Rinné on the left side. The patient no longer had tinnitus, staggering, or vertigo.

H. Clayton Fox.

Adam, James.—**Infection of the Middle Ear with Vincent's Organisms.**¹
"Brit. Journ. of Children's Diseases," No. 134, vol. xii, February, 1915.

An analysis of seven cases seen by the writer in a comparatively brief space of time. The infection, though often present, is missed, owing to the failure of the organisms to grow on ordinary culture media, though they may be readily detected in smear preparations. The positive features common to these cases are: the constant presence of Vincent's organisms, the frequency of the pneumococcus as compared with other bacteria, chronicity, stinking and profuse discharge, masses of profuse and very vascular granulations in the more pronounced cases, slight tendency to the formation of membrane (this is probably always present at some stage, but is rendered obscure by the anatomy of the parts and the predominance of granulations), erosion of the external parts of the ear and slight glandular enlargement. The negative features are: absence of marked disturbance of general health, absence of pyrexia, absence of any history of throat infection, absence of special organisms on throat swabs, and absence of special infectivity.

The affection is usually amenable to local treatment, which consists in painting the eroded surfaces with 5 per cent. silver nitrate in spt. æth. nitr., cleansing, instillation of iodine tinct. and especially with instillation of ethyl-violet and brilliant-green, each in 0.1 per cent. watery solution. As in the pharynx, diphtheria has generally to be excluded in making the diagnosis. The affection appears to be a graft on another infection, generally pneumococcal, and to occur in cases that are grossly neglected. The coincident and constant occurrence of spirillar and fusiform bacilli has led the author to believe that this infection is less likely to be a symbiosis of two entirely different organisms than different life-stage forms of one organism.

J. B. Horgan.

MISCELLANEOUS.

Barton, E. A.—**The Condition of the Larynx and Trachea in the Still-born Infant, and its bearing on Artificial Respiration.** "Proceedings of Royal Society of Medicine," Obstetrical and Gynecological Section, p. 106.

The author draws attention to one or two points, the recognition of which appears to be of prime importance in the resuscitation of the apparently still-born living child.

On examination of a number of still-born children in whom no air had passed the glottis, the author found, in the majority of cases, the following condition: For about $\frac{1}{2}$ in. below the glottis, which is invariably closed, the trachea is open, narrowing like a funnel from above down till the point is reached where the lumen is entirely obliterated by the folding in of the ends of the cartilaginous rings behind. The trachea is now flattened from before back, and where the posterior part of the rings meet one another on the dorsal surface is a vertical groove. The muscular posterior wall of the trachea is folded in such a manner that by its contraction the infolded cartilage ends would be separated and an actual lumen be formed from a potential one.

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., December, 1915, p. 472.

The first inspiration of life, therefore, is a very complicated process: the glottis must be opened, the posterior wall of the trachea must contract, and by its contraction unfold the curled cartilages, converting a closed into an open tube.

The bearing of these points on the judicious use of artificial respiration is obvious. The glottis must be opened, the tracheal surfaces separated, and then only is artificial respiration possible by methods like Silvester's.

Archer Ryland.

Hektoen, L., and Rappaport, B. (Chicago).—The Use of Kaolin to remove Bacteria from the Throat and Nose. "Journ. Amer. Med. Assoc.," June 12, 1915.

From investigations made with kaolin in the Durand Hospital for Infectious Diseases, Drs. Hektoen and Rappaport found that when applied in the form of a dry powder kaolin removes not only diphtheria bacilli, but practically all bacteria from the nose and throat in the course of three to four days. The success of this treatment is due to the great absorptive power of kaolin and appears to depend largely on the free and thorough distribution of kaolin over the mucous surfaces. For this purpose the kaolin is blown into the nose six or seven times a day at two hour intervals, and for application to the throat the patient is instructed to swallow as slowly possible one third teaspoonful of kaolin four or five times an hour during the day. Kaolin is not irritative, and when taken into the mouth it gives rise to a feeling of grittiness.

Birkett (Rogers).

McIntyre, Donald.—The Vaccine Treatment of Scarlet Fever. "Brit. Journ. of Children's Diseases," No. 131, vol. xi, November, 1914.

A statistical record of a number of cases, including those complicated by nasal and aural discharges. In most cases no attempt was made to isolate all the organisms present. The cultures were made on ordinary agar and incubated for twenty-four hours. The organisms were then suspended in normal saline to which 0.5 per cent. carbolic acid had been added, and afterwards heated in a bath at 60° C. for an hour.

An initial dose of 100 millions was given; this was repeated at intervals of five days, the number of organisms being increased at each successive injection, until a maximum of 1600 millions was reached.

The author is of opinion that the success of vaccine treatment in scarlatinal cases with nasal and aural discharges is difficult to prove; but from his experience he is led to the conclusion that, with regard to nasal discharges, a cure is accelerated by vaccine treatment. Its comparative failure in aural cases he attributes to the multiplicity of organisms—especially diphtheroid organisms—often present in the discharge.

J. B. Horgan.

NOTES AND QUERIES.

The Managers of the Royal Infirmary, Glasgow, have appointed Dr. Peter Napier Grant, Glasgow, Surgeon to the Out-patient Department for Diseases of the Throat and Nose.

BISMUTH IN ESOPHAGEAL THERAPEUTICS.

"I have noticed that patients suffering from ulcerating cancers or from ulcers resulting from the impaction of foreign bodies or from injuries, and from other forms of acute esophagitis, have been relieved by the swallowing of bismuth paste which has been given in connection with a radiographic examination. Bismuth emulsion or bismuth made into a paste with a little water is therefore the ideal medium or base for the administration of analgesic powders."—DR. WM. HILL.

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**TWO CASES OF POST-OPERATIVE INTRACRANIAL
INFECTION OF OTITIC ORIGIN.**

BY H. LAWSON WHALE, F.R.C.S.

BASAL MENINGITIS; TRANSANTRAL DRAINAGE; DEATH ON THE
ELEVENTH DAY.

PRIVATE E——, aged thirty-two, admitted to hospital on September 7, 1915, with left otorrhœa of several years' duration. On examination there was a total loss of membrane, granulations tracking down the posterior tympanic wall from the region of the aditus, and profuse pus; there was no trace of ossicles.

Mentally he was extremely apathetic and dull; but there was nothing else to suggest intracranial complications.

After his admission his ear was diligently treated by cleansing solutions and drops of various kinds; but as a result there was no change in his condition, except that his apathy rather deepened.

On October 6 a radical mastoid operation was done; neither fistula into the cranium or labyrinth, nor bare lateral sinus, nor other abnormality, was encountered.

On October 9 there was a slight left facial paresis of infranuclear type; and the meatal drainage-tube was removed. The paresis steadily increased, and on October 11 was a complete paralysis.

On October 12 the cavity was re-explored, and a cell in the antral floor, formerly overlooked, opened and drained; this cell was nearly $\frac{1}{4}$ in. distant from the line of the facial ridge.

From this time the paralysis steadily lessened, and on October 19 was imperceptible.

On October 21 he became less apathetic, and complained of violent universal headache; the temperature, etc., and the discs, were normal. On the 22nd, 24th, and 25th, the temperature varied from 99° F. to 100° F., and on each of these days he vomited. The vomiting was of meningitic type.

From the 27th to 29th the temperature was irregular, from 100° F. to 102° F.; pulse falling from 80 to 66; respirations, 20 to 24. On the 28th, by lumbar puncture, 54 c.c. of turbid fluid was withdrawn in a continuous stream; it was still alkaline, but did not reduce Fehling's solution; contained a few streptococci, and 8000 leucocytes per c.c. The caloric reaction was less active on the affected side; but the discs were still normal. The withdrawal of thecal fluid heralded a rise of pulse from 66 to 128, and of respirations from 24 to 30.

On the 29th the wound was reopened, and the inner antral wall removed. The dura bulged markedly without pulsation; it was crucially incised, causing the escape of about an ounce of cerebrospinal fluid; a spiral silver wire tube $\frac{3}{16}$ in. diameter was passed towards the base of the brain, along the posterior surface of the petrous near to its superior border, for a distance of 2 in. from the antral cavity; 25 c.c. of polyvalent antistreptococcic serum were given in the flank, and after this 10 c.c. every other day; the hernia cerebri decreased after the relief of pressure.

For two days after the meningeal drainage, temperature and pulse were normal, and headache much less. After this, however, the temperature hovered between 101° $\frac{1}{4}$ F. and 102° F., pulse from 80 to 108, respirations from 24 to 30; headache returned, with occasional muttering delirium; and he vomited several times daily. The discs remained normal. He died on November 9. Throughout there had been only slight stiffness of the neck; and the reflexes on the two sides had been so variable from day to day, that no reliable deductions could be made.

Post-mortem.—Except for dilated veins, the vertex of the brain was normal. There was diffuse flocculent pus at the base, and some softening at the lower surface of the left temporo-sphenoidal lobe. There was no abscess in cerebrum or cerebellum. The lateral ventricles were normal. The posterior surface of the

petrous gave no clue as to the path of entry of the infection. The silver-wire tube appeared to have maintained a good open passage.

A CASE OF LATERAL SINUS THROMBOSIS; OPERATION; RECOVERY.

Private B—, admitted to hospital on September 22, 1915, with double otorrhœa; this had lasted as long as he can remember, and may or may not have dated from scarlet fever in 1901.

Examination.—On the right side there was a large inferior perforation, and a constant slight purulent discharge; on the left, a total loss of membrane, profuse pus, and no visible ossicles. Treatment by local applications for eight weeks much reduced the discharge on the right; but that on the left remained unaltered, and frontal and left temporal headache became intractable.

Operation.—On November 19 a left radical mastoid was performed. The antrum was small and deep, and the lateral sinus placed forwards to 1 cm. from the posterior meatal wall. The sinus was exposed for 1 sq. cm. Urotropin gr. x *t. d.s.* was given.

From the 21st to the 27th the temperature was irregular, from 100° to 102° F., pulse and respiration corresponding; headache was unabated. On the 28th the temperature rose, with a rigor, to 103·4° F., pulse 126, respiration 24. There was no vomiting, neck-stiffness, Kernig, or other abnormal musculo-tendinous phenomeua; pupils were equal and reacted, discs natural. There was neither tenderness nor thickening over the jugular vein. Mentally the patient was normal, neither apathetic nor excited. There was neither giddiness nor nystagmus. Tongue persistently foul for the last several days, despite calomel, etc. On lumbar puncture no fluid was obtained.

On November 29 and 30 the same clinical picture was repeated, but without rigors. Lateral sinus thrombosis was the provisional diagnosis, although that was, however, rendered uncertain by the presence of several cases of influenza in hospital.

On December 1 the temperature rose to 104·2° F.; the ocular fundi were still normal. There were no signs suggesting that the other ear was at all responsible.

Operation.—On December 2 two test-tubes of clear fluid from the lumbar theca were withdrawn; the fluid came off under pressure, the drops nearly merging into a continuous stream. The fluid was alkaline, reduced Fehling, showed forty lymphocytes per c.c., but no organisms; and was sterile on culture. The

cytological count was noteworthy, and seemed to suggest, if anything, tuberculous infection. The post-aural wound was reopened, and found to be very purulent. The bony opening was enlarged both horizontally backwards and downwards towards the bulb, until healthy sinus-wall was exposed proximal and distal to the unhealthy segment. This segment was half an inch long, dark in colour, covered with thin granulations, and inelastically resistant to the finger. There was no peri-sinus abscess.

In retracting the scalp it was noted that no bleeding occurred from a mastoid emissary vein; was this thrombosed and the entrance-portal of infection?

A strip of gauze was inserted backwards between sinus and skull, loosely, so that if necessary it might be pushed in more tightly to control hæmorrhage. The unhealthy sinus was now cautiously explored with a needle and syringe. No blood was encountered until the needle had gone in $\frac{1}{2}$ -in.; presumably there was a peripheral mural clot, with a central lumen.

With a scalpel the puncture was enlarged to 1 cm. in the axis of the sinus. A small amount of clot escaped, and the blood was allowed to flow freely for about ten seconds.

The posterior plug, between dura and skull, was tightened; and a second gauze plug pushed through the slit, down to and occluding the bulb.

Twenty c.c. polyvalent anti-streptococcic serum were given into the flank. Unfortunately the specimen of blood withdrawn was lost, and no culture made.

The internal jugular vein was now tied in the neck; the common facial vein was not encountered nor sought for.

Subsequent History.—The plugs were not removed until the fourth day; no bleeding resulted. Recovery was uneventful. Temperature, etc., fell by lysis, and was normal on December 11, nine days after the operation.

VINCENT'S INFECTION OF THE MIDDLE EAR AND EXTERNAL CANAL.

By JAMES ADAM, M.D.

DR. WYATT WINGRAVE'S paper on Vincent's Angina in the December (1915) number of the Journal (p. 472), and the *résumé* in the January number (p. 31) of my paper in the February issue

(1915) of the *British Journal of Children's Diseases*, tempt me again to refer to the subject. The latter paper was founded on the observation of seven cases; since that I have seen other nine, all in children. Of the sixteen only one was in an adult. Dr. Wingrave says that "our unbiassed perspective affords sufficient evidence that it is a disease *sui generis*." My own experience as to the ear confirms that remark. The clinical picture is such that by simply looking at an ear thus infected one can say "Vincent's infection." That, of course, is not the same thing as saying you can negative the presence of Vincent's organisms because the clinical picture is absent in a given case. All that is meant is that infection with these organisms ultimately produces a characteristic clinical picture in the ear. This may be summed up: chronicity, fœtor, blood-stained discharge, erosion of meatus and external canal, the erosion bleeding at the slightest touch and coated here and there with a thin greyish membrane, which later is apt to be hidden by angry, bleeding granulations crowding the canal. The patient is usually a child in fair general health. The canal is generally tender; but there is no marked swelling, and glandular enlargement is not a common feature. As Dr. Wingrave says, the disease is not markedly infectious. I have seen chronic aural discharge in three children of one family, two of them with Vincent's organisms, otherwise I have been unable to get a history of more than one case in any family.

That the disease is one of gross neglect is obvious not only from the clinical history and the fact that all were in the hospital class of patient, but also because very few cases could be got to persist in treatment beyond two or three attendances, although earnestly urged thereto. For that reason I am unable to say much about treatment. In one case, after improvement by prolonged medication of various sorts, a radical mastoid operation was done with good result. I am not prepared to pin my faith to crystal violet and brilliant green.

This disease seems to be a graft on a prior infection. Other organisms were always found, chiefly streptococci; after these come staphylococci and coliform or diphtheroid bacilli. In the few cases where swabs were taken from nose and throat Vincent's organisms were not found. It is to be noted that Dr. Wingrave says, "no adult mouth or throat is free from the organisms even in health"; but fifteen of these sixteen cases were young children. What I chiefly wish to emphasise is that this infection of the middle ear and external canal is not uncommon, and presents

a clear, easily recognised clinical picture not given in any text-book with which I am acquainted. That this is so is further proved by the contrast furnished by a case of unmistakable diphtheria of both ears. It was a girl of twenty who had been suffering for three or four days. She looked profoundly ill, had enormous swelling around the meatus of both ears, and this was covered by a thick diphtheritic membrane—all features contrasting with Vincent's infection. *B. diphth.* was found, and she was sent to Belvidere Fever Hospital, where she ultimately recovered.

**LATERAL SINUS THROMBOSIS FOLLOWED BY
TUBERCULOUS ABSCESS OF THE GLUTEAL
REGION SIMULATING PYÆMIC ABSCESS.**

By DAN MCKENZIE, M.D., F.R.C.S.E.

THE patient, a boy, aged thirteen, of Jewish parentage, was admitted to the Central London Throat and Ear Hospital on November 20, 1914, with discharge and pain in the left ear. In infancy he had suffered from otorrhœa in the same ear, but it lasted for one year only, and from that time until three weeks before admission to hospital the ear had remained quite dry.

On admission, some swelling and œdema over the mastoid process were perceptible, and there was also slight tenderness on pressure.

On November 21 a Schwartze operation was performed under chloroform. The cortex of the mastoid process and the underlying cells were removed without any pus being encountered. But the antrum was full of granulations, and eventually pus was found in a deep, highly-placed cell which led to a deeper layer of cells full of pus and granulations, and extending down the apophysis as far as the apex. In opening up those cells the lateral sinus was found to have been exposed by the disease, but, as far as we were aware, no injury was inflicted upon the vessel wall in the course of the operation, an important point in view of subsequent developments.

After the diseased areas had been freely laid open and curetted, the wound was packed in the usual manner, the lower segment of the incision being left open for drainage.

Three days later (November 24), while dressing the wound, the house surgeon (Mr. Souper) was surprised by the onset of

free venous hæmorrhage, apparently from the lateral sinus. It was quickly controlled by firm packing.

From this date until December 3 the temperature showed some tendency to rise, and on the evening of December 3 it shot up to 102.8° F. Another rise (to 103.8° F.) took place on December 5, and as the patient had a rigor on the morning of December 6, an exploratory operation was resolved upon.

On re-opening the mastoid wound and exposing the lateral sinus fully by removal of its bony wall, I found an opening in the sinus, the opening from which the bleeding had evidently proceeded. On slitting up the sinus in the usual manner, the vein was found to be patent and healthy above this wound, the blood flowing freely from the torcular region. Below the wound, however, a coagulum was found, filling the sinus and extending inwards towards the jugular bulb. The bony wall having been removed in an inward direction, the vein was further opened up, and the whole of this coagulum removed. After the sinus had been cleared, the jugular vein in the neck was exposed, tied, and resected in the usual manner.

The coagulum from the sinus was found, by Dr. Wyatt Wingrave, to contain *Staphylococcus albus*, but the jugular vein was sterile.

The patient stood the operation well, and the temperature came down during the next day or two, but it did not behave as if all the sources of sepsis had been removed, and I was considerably exercised in my mind to account for its irregularity, running as it did between 98° and 101° F., until the patient having complained of pain in the hip, I found on December 14 definite fullness and obscure deep fluctuation over the left sacro-iliac synchondrosis.

Thinking, naturally enough, that we had to deal with a metastatic pyæmic abscess, on December 16 I had the patient put under chloroform, and after aspiration had shown the presence of pus, I made an incision over the swelling and found a small abscess deep under the glutei muscles. No evidence of bone disease was found, and the abscess cavity did not seem to communicate with the hip-joint. But a narrow track was discovered leading downwards in the direction of the great trochanter, and a second incision was therefore made behind the trochanter so as to communicate with the lower end of this track and to provide counter-drainage.

During the following week the temperature was normal for most of the time. Occasionally, however, it rose in the evening to 99° F. The ear and neck wounds were going on well.

The sinus in the hip continued to discharge turbid serum, and

during the following month exuberant granulations formed at the orifice of the gluteal wound. The trochanter wound closed about December 24.

Suspicious of tuberculosis now began to fill our minds, and on January 15, 1915, Dr. J. Mackeith, who has been devoting much attention to tuberculin treatment at the hospital, kindly gave the boy a test-dose of O.T. 0.0005 mgrm. hypodermically. That evening the temperature rose to 99.2° F., and during the next few days the serous flow from the wound seemed to be rather more free than usual, but no other focal reaction appeared.

On January 22, a second and a larger test-dose was administered (0.0001 mgrm. O.T.), and on that evening the temperature rose to 101.2° F., while the serous discharge from the wound became really copious. But a more interesting and conclusive phenomenon appeared. After a couple of days of free discharge the sinns became dry, the exuberant granulations shrank, and by February 5 the gluteal wound had quite cicatrized over.

The mastoid and cervical wounds having healed, he was therefore discharged from the hospital, but remained under Dr. Mackeith's care for tuberculin treatment.

In April a small cold abscess appeared in the cervical scar, and was incised, rapidly healing again, doubtless under the influence of the tuberculin.

The family history shows some tendency to the occurrence of "chronic abscess."

Presumably the acute illness predisposed the patient to the occurrence of tuberculous abscesses. But I must admit that in the first instance I was completely deceived as to the nature of the abscess.

CLINICAL NOTE.

THE DANGEROUS REPUTATION OF ADRENALIN.

THAT adrenalin is regarded as a dangerous drug by many pharmacologists and anæsthetists comes with a shock of surprise to otolaryngologists, accustomed as they are to use it, locally, at all events, in a very lavish manner. For the general opinion among throat and ear surgeons undoubtedly is that adrenalin is a safe as well as a powerful remedy, particularly in cocaine poisoning and in conditions of surgical shock, therein agreeing with Brünings, who says:

"In the course of one or more minutes $\frac{1}{2}$ to 1 c.c. of the usual

1 : 1000 solution " (of adrenalin) " (or, better still, the corresponding quantity of a ten times diluted solution) is injected into a vein. Thereupon the mucous membranes lose their colour almost at once; an enormous rise in blood-pressure takes place, and the heart, under the influence of the direct action of the adrenalin, often begins again to beat, when all other stimulants had failed " ("Die direkte Laryngoskopie," p. 173, f. n.).

When, however, we listen to recent workers upon the pharmacology of adrenalin, we discover that a proceeding such as this of Brünings would be regarded by them with serious misgivings.

Injected directly into a vein, as Brünings directs, adrenalin induces a widespread series of phenomena which Elliott has shown to be due to stimulation of the sympathetic nerves all over the body. To begin with, there is a general contraction of arterioles, save in the lungs, the brain, and the heart, in consequence of which a great rise in blood-pressure occurs. Obviously, if the heart be weak, the obstruction to its efforts produced by the general vaso-constriction may have serious consequences, unless, as Brünings says, the action of the adrenalin upon the heart muscle is of a stimulating character. As to this, if we are to credit recent observation, Brünings and the rest of us are wrong. Watson points out that the rise in blood-pressure affects the systolic phase only, the diastolic pressure being actually much lower than normal. These are the characters of the blood-pressure readings in aortic regurgitation. Consequently Watson suggests that adrenalin prevents the normal closure of the aortic valves by its dilating action upon the muscular tissue of the root of the aorta. If this be true, then the rise in blood-pressure after the injection of adrenalin is misleading as an indication of an increase in the vigour of the circulation.

In opposition to this opinion, however, we note the statement of a well-known pharmacologist, such as Cushny, that the effect of the drug upon the sympathetic nerves in the heart leads to an acceleration and augmentation of the beat, which, after a longer or shorter period of reflex vagus inhibition, recurs and persists until the action of the drug has passed off.

Thus opinion does not seem to be quite decided on the point.

Again, adrenalin given hypodermically in the course of a chloroform narcosis has on several occasions been followed by the collapse and death of the patient, an accident which Levy has attributed to cardiac fibrillation.

For this reason Mortimer and others have uttered warnings against the use of adrenalin, not only intravenously, but even hypodermically, during chloroform narcosis and in shock.

Watson, indeed, goes so far as to say that "adrenalin is a dangerous drug which should always be used with caution and never as a general blood-pressure elevator," which is exactly opposite to Brünings' advice given above.

Which is correct?

Most practising oto-laryngologists, arguing from their own large experience of adrenalin in all sorts of conditions, will probably be inclined to side with Brünings, and to look upon adrenalin as being not only harmless, but also useful in counteracting and relieving surgical shock. To begin with, there is no doubt whatever that, when cocaine is used for surface anaesthesia in combination with adrenalin, cocaine poisoning is less frequent than when the former is used alone. Again, when adrenalin is combined with novocaine and eucaine and used in infiltration

anæsthesia, shock both during and after operation is certainly much less severe than when a general anæsthetic is employed.

It is true that when adrenalin is used in these ways, the local ischæmiæ, which is at once induced, sets up a barrier to the rapid absorption of the drugs into the general circulation. Nevertheless, it is against the hypodermic use of adrenalin, no less than against its intravenous administration, that Watson and the anæsthetists have uttered their warning.

Then, again, there is the use of adrenalin hypodermically in the treatment of asthma, a method which its success is rendering exceedingly popular. The apparent mystery of the action of adrenalin in asthma, by the way, is cleared up by Cushny, although, curiously enough, he does not seem to mention its employment in this complaint.

"Adrenalin," he says, "injected intravenously dilates the bronchi widely, an effect which is especially noticeable when they have been previously contracted by pilocarpine or physostigmine. This is not the same as the dilation caused by atropine, but arises from adrenalin stimulating the terminations of the bronchial sympathetic fibres, which cause relaxation of the muscle." ("Text-book of Pharmacology and Therapeutics," sixth edition, 1915, p. 368.)

The present writer has a vivid recollection of a case in which, after a nasal operation had been performed upon an asthmatic patient under chloroform, an alarming attack of asthma set in as he was coming round from the anæsthetic—the usual time for such an event, we may remark. The breathing became more and more laboured in spite of all efforts to relieve it, and cyanosis was being followed by the ominous livid pallor that signals the imminent failure of heart and respiration when $\text{m}5$ of adrenalin solution (1 : 1000) were injected hypodermically. The effect was magical. In about half a minute the spasm ceased, and the breathing became quiet and peaceful, with a rapid restoration to the normal in the colour of the lips and face.

It is said that the habitual use of adrenalin in asthma is likely to lead to arteriosclerosis. At all events, a German experimenter has reported this as having occurred in animals. Whether his observation has ever been confirmed or not it is difficult to say. The belief in such an ending, nevertheless, has obtained a wide currency. All the same, most asthmatic people seem inclined to risk the arteriosclerosis.

Equally in opposition to those who look upon adrenalin as a dangerous agent is the practice, suggested and carried out by Milian (see *JOURNAL OF LARYNGOL., RHINOL. AND OTOL.*, vol. xxix, p. 168), of counteracting the depressant effects of salvarsan upon the circulation by an intra-muscular injection of 1 to 2 c.c. of a 1 : 1000 solution of adrenalin, immediately before the arsenical compound is administered.

From the foregoing remarks, then, it will be seen that in this matter of the action of adrenalin upon the system there seems to be considerable disagreement between the clinician and the pharmacologist, a by no means unprecedented occurrence, and one which is, probably, to some extent traceable to the fact that the clinician is an observer of the action of the drug in abnormal conditions, while the pharmacologist records its behaviour in normal conditions. Watson's experiments, for example, were carried out in healthy young men and women, in whom, of course, the blood-pressure behaves quite differently from what it does in asthenic persons.

In chloroform narcosis, again, the occurrence of a few fatalities after adrenalin had been injected may only have been a coincidence. Levy's

explanation, that death was due to the adrenalin setting up fibrillation of the cardiac muscle, is vitiated by the fact that chloroform itself is said to induce fibrillation at times, and to cause death by doing so. And when it is remembered how frequently adrenalin is employed during surgical operations under chloroform without any apparent ill effects, one feels even less inclined to adopt the opinion that it is particularly dangerous to employ adrenalin under these conditions.

A survey of the whole question, then, in all its bearings, leads us to the conclusion that the case against adrenalin is, for the present, not proven. Further investigation on the part of the pharmacologist is needed before the reliance of the operating surgeon upon the safety of adrenalin can be broken. At the same time, the latter cannot avoid being influenced by the warnings which have been given, to the extent of keeping a weather-eye open to the possibility of trouble arising from this source. The natural tendency, no doubt, will be to limit the application of adrenalin to mucous surfaces and to subcutaneous tissues, and to avoid the intravenous administration of the drug. The last-mentioned method is, of course, only adopted in combatting shock, and we possess, in pituitrin, for example, an agent which seems to be almost, if not quite, as powerful a remedy for this disturbance as adrenalin is, without, as far as we know, any of the reputed dangers of the latter substance.

D. M.

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SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

November 5, 1915.

President: DR. J. W. BOND.

Case of Bullet entering below Right Mastoid and emerging at Left Orbit.—Major Perry Goldsmith, C.A.M.C. (Toronto).—Lance-Corporal S——, aged thirty-four. On April 3, at St. Julien, patient

was standing with his back to the parapet when a bullet entered below the right mastoid and emerged at the inner angle of the left orbit. He was unconscious from April 23 to June 9. He has a hazy remembrance of having heard the nurse say, "Nothing was being done, as the man could not live." He gradually improved, however, and on August 30, before being sent back to Canada, he visited friends in the North of England. While there he suddenly developed left hemiplegia. He rapidly improved and entered Moore Barracks Hospital at Shorncliffe, and he came under my care. The notes made on October 9 are as follows: Small sinus at the inner canthus of left eye discharging pus. Complete right facial paralysis. Well-defined weakness of the left arm and leg, especially extensors and flexors, with wasting of muscles of left arm and leg. Sensory functions undisturbed. He is unable to balance himself on his feet and walks like a drunken man. Right ear quite deaf. Heart and lungs normal. Left arm: Humerus fractured at the middle third on the same day as other injury; good union and good alignment. Bullet still in the triceps muscle.

Present condition: Facial paralysis unimproved. Deafness obstructive in type. Right middle turbinal and ethmoid partially destroyed. Right sphenoid contains muco-pus. Yellow pus high up in the right nostril, probably coming from frontal sinus, which I was unable to irrigate. Right antrum negative; pus in the left infundibulum; left antrum contains foul pus. I was unable to get into the left frontal sinus wound as the inner canthus has been closed for some weeks.

Ophthalmoscopic examination: Right eye—large retinal detachment, and practically blind; when he blows his nose he feels as if something moves behind the right eyeball. Left eye—vision badly impaired, due to large detachment. There is also sensory disturbance over the right cheek-bone.

In civil life this soldier was a physician practising in Ontario, and enlisted as a private in the First Canadian Contingent.

I should like to hear opinions as to the desirability of operating on the infected sinuses. I am not sure how intimately the intra-ocular metabolism is related to that of the accessory sinuses, but the work of Ziem shows it is very intimate. If the clearing out of the sinuses will lessen the liability to further retinal detachment later, I will do it, but I do not want to do anything which will make the condition worse; the man's condition is very pitiable already, as he is blind in one eye and has an extensive detachment of the retina in the other.

Traumatic Paralysis of the Vocal Cord.—Major Perry Goldsmith, C.A.M.C.—Corporal T—, 3rd Battalion, First Canadian Contingent, aged thirty-two. Paralysis of left vocal cord, traumatic. Shrapnel wound in neck on April 22, followed by immediate loss of voice and spitting of blood; scar 2 in. external, and 1 in. above sterno-clavicular joint; was unconscious for about an hour, and hoarse when he came to; forty-eight hours afterwards shrapnel was removed. Subsequently a great deal of muco-pus and blood expectorated. Voice very rough; a little talking tires it. The recurrent laryngeal nerve was severed rather low down. Before the war such cases were rarely seen except after operations on the thyroid gland. Laryngoscopic examination: Fixation of left vocal cord; right cord compensating by over-action. If the head is well thrown back and he drinks anything it causes spasms of coughing.

Dr. WATSON-WILLIAMS: After a considerable experience of infected sphenoidal sinuses (and I have operated on several hundred patients), particularly cases in which the optic nerve tract has been distinctly involved, I should have no hesitation in opening the sinuses in the first case and establishing drainage. If this be supplemented by lavage and appropriate treatment, it promises improvement in the retinal condition and arrest of the sinus disease. I have never seen any untoward results from that course in regard to the visual or colour fields, and where these are contracted it often results in restoration to the normal.

Dr. DUNDAS GRANT: I agree that the advice tendered by Dr. Watson-Williams is the wisest and safest for this patient. With regard to anastomosis of the facial nerve, there are fine descriptions of it in many books, but reports of end-results are very sparse. I would like to know from those who have seen the results of such anastomoses whether they have been satisfactory.

Dr. JOHNSON HORNE: The question in the second case is as to whether anything can be done to improve the voice. Similar cases in men from the Front have come under my notice, and in the light of these I think that the region should be examined with the X rays, to make sure there is no cause of pressure, such as the presence of a shrapnel splinter, on the recurrent laryngeal nerve. If nothing is seen, I am opposed to any exploratory operation. Experience shows that in such cases time is a healer.

Mr. TILLEY: I agree with Dr. Horne's advice. I have seen two cases of palsy of the recurrent nerve from neck wounds; apart from this lesion the patients are well. The wounds have healed, and the X rays do not reveal any foreign body in the neck. My advice is to leave matters alone, because one does not know whether the nerve is cut or only bruised; in the latter event, time may show a recovery; and in such cases, even if the cord remained paralysed in the adducted position, the voice becomes quite good owing to a compensatory action of the other vocal cord.

Dr. PETERS: With regard to the patient with nasal trouble, in a somewhat similar case, but in which the bone was not so interfered with, I took out the middle of the nose and did a modified Roux's operation. The nose in this case was a very long one, and the procedure gave a very good result, enabling the nasal passages to be opened. With regard to Major Goldsmith's sinus case, it is extraordinary to see how the infection seems to have developed through the sphenoidal region and to have imitated, to some extent, the paralysis which is so common after cerebrospinal meningitis, though I do not know that the meningococcus is present in this case. The infection, probably streptococcal or by some other non-thrombosing coccus, has found its way through the sphenoidal region. There has been active mischief, and I recommend draining. In the laryngeal case it is most difficult to know how much of the paralysis is due to shock and how much to actual nerve damage. In one case I saw, in which the paralysis was evidently due to shock, the cord had been in a position of abduction spasm, and the condition varied from day to day.

Encapsulated Tumour removed from Region of Left Tonsil, Soft Palate, etc.—J. W. Bond.—Patient, aged sixty, was found by a dentist to have a growth at the back of his mouth. The fauces were two-thirds obstructed by a mass on the left, projecting from between the pillars of the fauces, upwards into nasopharynx, downwards to base of tongue, forwards to mid-line of ramus. The posterior border could

not be reached behind, and, externally, it presented between the angle of jaw and the mastoid. As a whole it was smooth, hard in parts, with defined border, and slightly movable. Operation, five days later, by exposing surface of growth in fauces, no splitting of cheek being found necessary. It seemed especially attached far back, internal to the mastoid process. A preliminary laryngotomy was performed. The pathological report is of a roughly lobulated, encapsulated mass, weighing 51 grm., and measuring 6.5 cm. by 4.75 cm.: "On section it is composed of alveoli and strings of cells enclosed in a stroma of fibrous tissue, with myxomatous and cartilaginous areas. Its general structure is that of an endothelioma, such as would arise in the palate or in a salivary gland. We do not think it is strictly a tonsillar tumour."

Tumour of Palate.—George Badgerow.—Male, aged thirty-eight. The tumour has been slowly increasing in size; there is slight difficulty in swallowing and speaking. The swelling obscures the faucial arch and projects forward on the base of the tongue, lying more to the right of the middle line.

The PRESIDENT: I regard Mr. Badgerow's case as an adenoma, and I think it can be readily removed by enucleation.

Dr. DONELAN: I reported a similar case to the Section several years ago. Endotheliomata in that region, the so-called "potato tumours" of Jonathan Hutchinson, are supposed to originate from the carotid body, and might, as in this case, be present in the pharynx. I would like to know whether the President found anything in his dissection which supports that view. The reference to an attachment inside the mastoid would seem to show that it does not hold in all cases. In my own case the tumour had a more distinct relation to the carotid, and, growing outwards, ultimately involved the skin. A general surgeon was consulted at an early stage, but as it even then involved all the great vessels it was considered inoperable.

Mr. O'MALLEY: I have recently seen two practically identical cases. The first was sent from France as a peritonsillar abscess, which had been opened on two or three occasions and nothing found in it. I enucleated the mass, which was absolutely encapsulated, between the mucous membrane at the front and the mucous membrane at the back, in the soft palate tissue. I had a section made of it, and one pathologist reported it as sarcoma; that was previous to my operation. Since then I have taken portions to two authorities, who regard it as adenoma. In the second case I saw, I did not hesitate to attempt enucleation. It shelled out easily, and healed up as well as a wound could. Perhaps, under the circumstances, I shall not be able to see the patient long enough to know whether there will be a recurrence, but I do not anticipate such an event.

The PRESIDENT (in reply): I think the tumour I removed came from the base of the skull. With difficulty I reached the back of it from the mouth, and was able to remove it after stringing it with fishing-line and pulling with gland forceps, twisting one way and the other, and also using a raspatory. For several weeks after the operation the patient complained much of giddiness when he stooped, but that has passed off, and he is now increasing in weight at the rate of 1 lb. per week.

Intrinsic Cancer of the Larynx, One Year after Operation by Laryngo-fissure.—Sir StClair Thomson.—This gentleman, aged seventy, was shown to the Section on November 6, 1914, before opera-

tion,¹ and again on December 4, 1914, after the operation of laryngo-fissure on November 12.

It will be remembered that doubt was thrown on the diagnosis by some members at the first meeting, as the cord was mobile and no portion had been examined under the microscope. A section of the growth removed at the operation was shown before the Section on February 5, 1915, and was reported on by Prof. Shattock to be an early squamous-celled carcinoma. It will also be remembered that the microscopic examination of the growth removed by laryngo-fissure on November 12 suggested that the growth had spread right up to the line of excision in the posterior subglottic region. A second laryngo-fissure was therefore performed on November 20, and the patient was shown to the Section a fortnight later. The case is shown for the following reasons: (1) The diagnosis was made in the absence of any microscopic report and in a case where the cord preserved its mobility. (2) Although the patient had reached the age of three score years and ten, he was able to support two operations for laryngo-fissure within ten days of one another. (3) He has passed the first, *i. e.* the important, year of probation without any suspicion of recurrence. (4) He has a good strong voice and enjoys excellent health.

The PRESIDENT: It seems to be a very successful case; on the whole, one expects these cases to be successful, as the operation performed has become a regular and standard one, and that fact does credit to the various past presidents of the Section. To me the particular case is not so interesting as the difficulties of operation, and I would like to know from Sir StClair Thomson what he finds to be the chief difficulties. My own difficulty consists chiefly in seeing properly the area of operation.

Mr. HERBERT TILLEY: I note the words, "He has passed the first—*i. e.* the important—year of probation without any suspicion of recurrence." I think one should be very careful in these cases, because there is a feeling abroad that if there be no recurrence in the first year, one is warranted in speaking of the case as cured. Here is a photograph of a recurrence nine years after the primary operation, this recurrence causing death from re-growth in the other cord, ending in sudden suffocation. I have had another patient, originally under the care of Sir Felix Semon, who suffered from recurrence thirteen years after removal of carcinoma. Two months ago I saw a third case on whom I operated seven years ago; he came because his voice was not so good, and a recurrence of typical epithelioma was seen, for which half the larynx was removed. Last week I saw a fourth case, which was shown at this Section two years ago, and there is now a granular-looking recurrence. The time has come for revision of the view that absence of recurrence for a year is tantamount to cure. With regard to the operation, my custom is to use a strong headlight, which overcomes all the difficulty of which the President has spoken.

Dr. JOBSON HORNE: As one who threw doubt on the diagnosis of the case when it was first shown to the Section, I still feel, from a clinical point of view, that it must have been a very early case indeed of epithelioma. The early diagnosis strengthens, of course, a favourable prognosis. With regard to the control of hæmorrhage and the movement of the parts during the operation, some years ago I adopted the use of cocaine. A pledget of cotton wool soaked with a 10 per cent. solution of cocaine is placed within the larynx immediately after the thyroid

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxx, pp. 133, 161.

cartilage has been opened. That causes much blanching of the area of operation, but bleeding from a small vessel in the arytaenoid region at times give trouble. Cocaine, in my opinion, is preferable to adrenalin.

Dr. DUNDAS GRANT: I think it important, in order to get a good view, to make a clean section between the vocal cords, at the anterior part of the larynx. I have seen a very experienced surgeon get only a confused and difficult view after opening the thyroid cartilage from without. I make the incision from within outwards, passing the bistoury from the thyroid notch inwards and downwards, afterwards cutting outwards. That cannot be done very well if the cartilages are already ossified, but much the same effect is produced by using Waggett's forceps for splitting the thyroid cartilage. The occurrence of hæmorrhage is another difficulty, this taking place after the cutting away of the cord; I have used the galvano-cautery in these cases, even the Paquelin, and that seems to be excellent also in preventing recurrence; its use is strongly insisted on by many American operators. The only objection to the cautery seems to be that the voice is not quite so good afterwards as if it had not been used. We feel indebted to the exhibitor for having had the coolness to do a second operation; it was much better than anxiously waiting to see what would happen.

The PRESIDENT: I think some of the cases of recurrence are really due to inoculation of diseased cells. It is well known that these cells cannot live outside the body.

Sir STCLAIRE THOMSON (in reply): I cut off the patient's tobacco and alcohol for a week before the operation, have the mouth purified, and any tooth stumps extracted. I am also very particular whom I have as anæsthetist, so that there is no risk of air-starvation. An hour before operation I inject the skin with eudrenine, which renders the area practically bloodless until the trachea is reached. Then I stab the trachea with a hypodermic syringe containing 15 drops of $2\frac{1}{2}$ per cent. cocaine. That makes tracheotomies as peaceful a performance as opening mastoids. After this stabbing of the trachea with the local anæsthetic, I wait ten minutes; then the sudden rush of air which follows the introduction of the tracheotomy cannula does not cause the reflex cough which so often splashes the operator and surroundings. After splitting the larynx I put in a pledget of wool soaked with cocaine and adrenalin. The removal of the growth is done by submucous resection. I try to raise the vocal cord with its tumour by dissecting up the perichondrium, so as to leave the inner surface of the thyroid cartilage bare. Years ago, before submucous resection came in, hæmorrhage was a great trouble, but that does not now come on until the undermined growth is removed. Then I divide above and below, leaving the worst until the last, namely, separation round the arytaenoid. Here there are many muscles and attachments, and a little vessel which sometimes spouts. That can be pinched for a short time with pressure forceps. I agree as to the difficulty of seeing properly in these cases; quite apart from the light, one only gets an oblique view, and the thyroid wings cannot be forcibly separated. I have tried to overcome that difficulty by semi-dislocating the larynx on the spinal column. With regard to recurrences, I think our views may be summed up by saying that if a case comes back with disease within a year, it is incomplete removal; if it comes back after that time, it is recurrence. It is the first year which is the anxious time, and especially the first three months. Recurrences at the long periods mentioned by Mr. Tilley are a matter which the Cancer Research may well take up, because the recurrence of disease is not always at the original area. I have had a case in which the recur-

rence was at the base of the tongue on the opposite side; yet there is but little direct lymphatic connection between the two sites, namely, the right cord and the opposite lingual tonsil. This morning I suffered one of my disappointments—a patient on whom I did laryngo-fissure followed by a complete laryngectomy six years ago. It was one of my show cases; the patient wore a Von Brun's instrument, and spoke well. Now there is a very hard gland attached to the carotid, and I feel sure it is malignant; yet there has been no recurrence in his throat meanwhile. I agree with Dr. Grant's remarks as to cutting from within outward. If there is ossification, I use a saw. I use Waggett's shears, which have been considerably improved by Dr. Irwin Moore.

Congenital Fistula of the Nose.—Hunter Tod.—Male adult. At birth a small opening was noticed at the lower part of the bridge of the nose. As long as the patient can remember, a slight secretion could be squeezed out on pressure. During the last two or three years an inflammatory swelling has occurred intermittently over the bridge of the nose which appears to be due to retention of the secretion. Opinions are invited with regard to treatment.

Dr. KELSON: I have had two similar cases: one a girl, whom I showed in 1904, whose photograph I now exhibit. Both the cases were very obstinate, and both were operated upon several times. One finally healed, but the other disappeared from my view. I expect Mr. Tod will find some difficulty in this case. Fortunately his patient is a man, to whom the question of after-appearance is not so vital as to a female.

Mr. ROSE: I have had one such case. Before I saw the patient for the first time, the external opening had been closed by a previous operation. A cyst had formed, converting the end of the nose into what looked like a red cherry. On opening the cyst, pus and clear glairy fluid exuded. The pressure of the cyst had caused absorption of part of the nasal bones and a considerable area of the triangular cartilage. I tried several times to destroy the lining of the cyst: it could not be dissected out without removing a considerable part of the external skin of the nose. It was scraped on several occasions and various caustics were applied, but when the opening was allowed to close, the swelling returned and burst or had to be opened. The most recent efforts have taken the form of electrical treatment—rather powerful ionisation. Recently I heard that the fistula is now closed and that there is no sign of recurrence. To rely upon scraping is, in my experience, unfavourable.

Mr. HUNTER TOD (in reply): I brought the case because I foresaw difficulties. I consider this is a true congenital cyst of the nose, owing to lack of fusion of the globular processes with the fronto-nasal process. The patient complained bitterly because his nose swelled up at intervals and was unsightly. I told the patient that operation probably would be successful, but might be a failure, and therefore the patient should himself decide whether he would submit to it or not. I am indebted to Mr. Rose for his opinion.

Malignant Papillomatous Growth of Left Inferior Turbinate and Ethmoidal Region.—Hunter Tod.—Mrs. L——, aged sixty-two, was first seen in January, 1911, complaining of left nasal obstruction and epistaxis. On examination, the left side of the nose was found to be occupied by a soft, papillomatous growth, attached by a broad

base to the inferior turbinate. The growth was removed, but recurred in three months. It was then removed again. Microscopical examination of portions of the growth on each occasion proved it to be a proliferating papilloma.

In December, 1911,¹ the patient was shown to this section by Mr. E. W. Bain. There was an interesting discussion with regard to the nature of the growth, it being considered of rare occurrence. A portion of the growth was then sent to the Morbid Growths Committee, who subsequently reported as follows: "All agree that it shows the structure of an innocent papilloma."

Shortly afterwards the patient ceased attending the hospital, and only returned in October, 1914, complaining of pain over the left side of the face. Intra-nasal examination showed the left side to be filled with the growth, which appeared more friable and hæmorrhagic than when seen two years previously. There was also much purulent discharge. The antrum was dark on transillumination and was punctured through the inferior meatus of the nose. A small quantity of pus was washed out. A portion of the growth was removed and sent to the pathologist for microscopical examination. His report was "papillary columnar and polygonal-celled carcinoma of mucosa of inferior turbinate."

The patient was admitted into the hospital and operated upon on October 29, 1914. The external carotid was first tied in the neck. An incision was made from the level of the inner canthus of the left eye and continued downwards along the junction of nose and cheek, curving round the ala nasi until it entered the lower margin of the nostril. On the soft parts being retracted and well separated, a clear view of the interior of the nose could be obtained. The anterior alveolar and nasal portion of the superior maxilla was removed, exposing the growth, which could be seen to have pushed the nasal wall of the antrum outwards, so that the antrum itself was quite a small cavity and was filled with pus. An attempt was made to shell out the growth, but it was too friable and had to be removed piecemeal. The whole of the antro-nasal wall, including the inferior turbinate and ethmoidal region, was completely removed and the sphenoidal cavity everted. At the end of the operation the interior of the nose appeared as a large smooth cavity. Owing to the tying of the external carotid, there was very little bleeding. The external wound was sutured and the nasal cavity plugged with strips of gauze smeared with sterilised oil, which were removed two days later. The patient made an uninterrupted recovery.

In March, 1915, some granulations appeared in the sphenoidal and post-ethmoidal regions. A microscopical section of a portion removed showed "solid trabecular columnar and polygonal-celled carcinoma of the mucosa." The patient was admitted to the hospital. The area of growth was removed by means of curetting and punch forceps. A tube of radium was then applied directly to this area and left within the nose for twenty-four hours.

On October 5, 1915 (one month ago), a few granulations appeared at the margin of the sphenoidal opening. As a precautionary measure, a tube of radium was again applied locally for twelve hours and the granulations subsequently disappeared. The nasal cavity now appears quite free from growth, the only inconvenience being that owing to the size of the cavity it becomes lined with crusts if the patient is at all

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxvii, p. 160.

neglectful with regard to keeping it thoroughly clean. Microscopic sections are shown.

The PRESIDENT: Here again the question of recurrence due to inoculation occurs. The result seems to be very good.

Mr. ROSE: I regard the specimen as of unusual interest, and I am glad it has been brought forward. I have had two similar cases, but have lost sight of them. A recurrence occurred in each case, and the growth was removed, and as long as the patients were kept under observation there was no further recurrence. If anything further happens in this case I hope Mr. Tod will report it.

Dr. PEGLER: The original specimen shown by Mr. Bain is now in the Museum of the Royal College of Surgeons, and is highly interesting as an example of what was then considered to be an unusually large papilloma. A microscopic section of it is in the cabinet, and I hope Mr. Tod will forward a section of the present growth, which, if malignant, makes a comparison of the two a point of special interest.

Mr. HUNTER TOD (in reply): Since the case was put on the agenda, Dr. Turnbull, Pathologist at the London Hospital, has again examined the section very carefully, and is not now so certain that the case is a true carcinoma. He now reports as follows: "The specimens show a villous, fibro-epithelial, transitional celled growth. The proof of malignancy in such a growth depends upon invasion of the subjacent tissues by the epithelium: of this there is no evidence except in one spot in specimen 1. The formation of atypical cells in the epithelium is, however, so frequently the precursor or accompaniment of invasion that the appearances in specimens 1 and 3 justify, I think, a diagnosis of malignant tendency." Though the diagnosis was that the growth was of malignant tendency, I think the operation which has been performed is the correct one. I should like the Morbid Growths Committee to express an opinion about the growth, as I regard it as an important case.

Chronic Suppuration of the Left Frontal Ethmoidal and Maxillary Sinuses.—J. L. Irwin Moore.—This case, a female, now aged fifty-four, was shown at the Section meeting on May 5, 1911,¹ to illustrate the satisfactory results of a complete Killian operation on the left frontal sinus. An intranasal operation had also been performed at the same time on the left maxillary antrum. Previously to the operation patient had suffered for eight years from severe pain over the left frontal sinus shooting down the face and neck, with constant discharge of pus from the left naris. She used six handkerchiefs a day.

When operated upon in March, 1911, the left frontal sinus was full of pus and degenerated mucous membrane. A complete Killian operation was performed, and it was necessary to remove the roof of the orbit in order to obliterate the sinus. The ethmoid cells, which were extensively diseased, were removed together with many polypi and much degenerated mucosa from the left maxillary antrum.

When shown in May, 1911, the left frontal sinus was completely obliterated, there had been no nasal discharge since the operation, all headache had disappeared, and the patient's health had greatly improved.

Patient is now suffering from atrophic rhinitis of the left nasal fossa with great pain over the left maxillary antrum extending to the ear and side of neck. Three months after operation the left nasal fossa again began to secrete pus in considerable quantity, which appeared to come

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxvi, p. 355.

from the maxillary antrum. A Caldwell-Luc operation was therefore performed on this left antrum and some unhealthy polypoid mucosa removed. Improvement followed for six months till June, 1912, when the discharge of pus again became considerable, accompanied by crusts. The pain over cheek became more severe. Examination of the pus showed the presence of the Friedländer bacillus. Two months' treatment by vaccine diminished both the discharge and pain for six months, patient at this time using only one handkerchief a day.

In January, 1913, discharge again increased, and became more atrophic in character, with fishy smell, accompanied by exacerbations of pain. Vaccine treatment for six months resulted again in great improvement, there being scarcely any discharge, the patient "hardly knowing what it was to use a handkerchief."

In consequence of intense infra-orbital neuralgia from June to October, 1913, the left maxillary antrum was reopened through the canine fossa, and the bony canal surrounding the infra-orbital nerve was partially removed, with great relief of pain.

From January to June, 1914, discharge again increased. A three-months' course of vaccine gave no result. Since this date the discharge and pain have continued with only slight variation from day to day, and no treatment gives any relief.

Although troubled with this atrophic condition and severe pain, patient's health is much better than when first seen in 1911. Any suggestions as to treatment would be most acceptable.

Mr. TILLEY: I have had one or two cases of sinus suppuration in which the radical operations were performed and the sinuses cured, but afterwards the patients had typical atrophic rhinitis with crusts. I cannot explain the reason for this. If Dr. Moore can cure the headache accompanying atrophic rhinitis—a very common symptom—he will earn my thanks.

Mr. O'MALLEY: I recently operated upon a case in which the antrum had previously been opened and had closed. Though the opening is now patent, the patient still complains of pain in the cheek. There is nothing the matter with the frontal sinus in this case, and I wondered what was the explanation. I have looked up a dry skull and have seen that an ethmoidal cell passes as far out as the infra-orbital canal, and there seems no reason why structures in that canal should not be involved, just as sphenoidal sinus disease involves the optic nerve. In doing an extensive frontal sinus operation it is very difficult to approach that region unless one proceeds upwards from the antrum under the floor of the orbit. I do not think the recurrence in Dr. Moore's case can be due to atrophic rhinitis, which is a continuous and not an intermittent affection, and there is probably a cell under the floor of the orbit which from time to time causes these recurrences, implicating the infra-orbital nerve.

Dr. PEGLER: I consider it a mistake to call this condition "atrophic rhinitis," the true pathology of which is so little known. These traumatic cases should be distinguished from the idiopathic disease. Few authorities will agree that the local pain is due to neuritis, but most will have found that the headache in atrophic conditions can be much relieved by careful lavage; at least, that is my own experience.

Dr. DAN MCKENZIE: In my experience, cases of the kind are not uncommon. There is a drying up in the process of getting well, and what is called atrophic rhinitis occurs. If Dr. Moore were to leave this case alone without further treatment I think it would get well. There comes a time in such cases when, as far as intranasal operating is con-

cerned, discretion is the better part of valour. The pain I consider to be due to neuritis, which will also disappear in time.

Dr. MOORE: I consider that the condition is due to atrophic rhinitis. I cannot find any ethmoid cells to account for the discharge, for they were thoroughly removed at the time of the original operation. There is no doubt that the frontal sinus cannot account for it, for this was completely obliterated. No sphenoid sinus can be found; this was apparently obliterated at the same time as the ethmoid cells. The patient washes out her nose daily, but is much troubled at times with large atrophic scabs in the post-nasal space. She is anxious to be relieved of this, also of the pain. I ask for suggestions as to further treatment.

A Nasopharyngeal Polypus (Choanal Polypus) originating in the Right Maxillary Antrum.—J. L. Irwin Moore.—The patient, a male, aged forty-two, was shown at the meeting on May 7, 1915. He had a growth in the right maxillary antrum extending through the middle meatus into the nasopharynx, where a dependent portion could be seen. Following the introduction of the radium emanation tube on April 20 into the maxillary antrum, the swelling over the outer antral wall, which involved a portion of the soft parts, gradually subsided. A fetid purulent discharge followed from the naris and the opening in the canine fossa.

On June 15 patient complained of a recurrence—during the previous five days—of the brawny swelling over the right maxillary antrum, accompanied by marked oedema of the right lower eyelid.

On June 24 under chloroform an attempt was made to pass a wire snare through the right naris in order to encircle the post-nasal dependent portion of the growth, with a view to evulsion. From a post-rhinoscopic examination this appeared to be quite simple, but it was found to be impossible on account of the growth obstructing the choana and being firmly attached to the choanal margin. No forceps would pass along the naris past the growth, the aperture only admitting instruments the size of the snare tube. With the patient's head in the dependent position, the protruding post-nasal extension of the growth was removed piecemeal through the mouth by means of Luc's forceps, guided by the index finger of the left hand in the nasopharynx. This portion of the growth was of a hard consistence and firmly attached to the choanal margin and the sphenothmoidal recess, and it had absorbed a portion of the posterior edge of the vomer. The removal of the intranasal portion of the growth was carried out in a similar way by the forceps. The opening into the maxillary antrum through the canine fossa was next enlarged, and the antral portion of the growth, which filled nearly the entire cavity, was found to be soft and necrosed. This was removed, together with the antro-nasal wall, which had been partially absorbed by the growth. The turbinates and ethmoidal cells had also been absorbed, so that the operation converted the left nasal fossa into one large cavity. There was no post-operative hæmorrhage and no packing was required. The patient made a speedy recovery and left the hospital in a week.

The case is interesting in that (1) it confirms the view that the maxillary antrum may be the seat of origin of these nasopharyngeal polypi (choanal polypi). (2) It shows that these polypi are subject to inflammatory changes, and may cause extensive adhesions and absorption of bone, *e.g.* in this case there were found necrosis and absorption of portions of the outer antral wall involving skin of the

cheek, nasal wall, sphenoidal sinus, ethmoidal cells, and vomer. (3) The rapid removal of such a growth with the forceps makes the bleeding negligible. (4) The dependent position of the head does away with the danger and risk of blood being drawn into the larynx, and hence avoids the necessity of a preliminary tracheotomy. (5) The growth could not have been removed *en masse* by evulsion with forceps or snare. By these three routes it was possible to remove piecemeal the whole of a very extensive growth, so that more formidable procedures—*e.g.* Moure's or Rouge's external operations—were unnecessary.

The skiagrams by Dr. Finzi show both maxillary antra to be somewhat opaque, the right more so than the left. This is well seen in the oblique views. The right sphenoidal sinus is very opaque, and also the ethmoidal cells on the right side. The photograph of patient taken before operation shows the marked swelling over the right maxillary antrum. Microscopic sections of the growth are shown.

Report by Professor S. G. Shattock.—(A) *From the maxillary antrum.*—The pedicle: This consists of loose, connective tissue, of an open felt-work of slightly wavy fibrils, fairly well provided with proper cells. That the material is not a mere coagulum appears from the fact that the fibrils are arranged more or less in intersecting bundles, and so present the usual differences according as the bundles are divided longitudinally or transversely, and the cells exhibit corresponding variations in form. The vessels are comparatively few and of inconsiderable size; the hyaline condition of their walls may be ascribed to the imbibition of fluid, the open character of the fibrous tissue being indicative of an cedematous infiltration.

(B) *From the nasal cavity.*—This exhibits the typical structure of a soft fibroma, and consists of loosely arranged wavy fibres, amongst which there is a fair abundance of proper lamellar cells. The investing epithelium is in places intact.

(C) *From the nasopharynx.*—This portion of the tumour consists of a particularly open feltwork of very delicate fibres arising from coarser strands of connective tissue, the appearances being attributable to oedema of a connective tissue basis, arising probably from pressure constriction. The proper lamellar cells are relatively few, but their nuclei are well stained. Polymorphonuclear leucocytes and plasma cells occur in the meshes. The vessels are filled with normal blood; here and there the tissue is necrotic.¹ The investing epithelium is in places intact. The histological diagnosis of the neoplasm is a soft fibroma in which cedema has occurred.

The PRESIDENT: I consider that in many of these cases there is no necessity to think of doing a laryngotomy or tracheotomy. It is unusual for these growths to involve the skin of the cheek. I have never seen a choanal polypus do so; such involvement is seen oftener in the case of sarcoma.

Final Notes on a Case of Malignant Stricture of the Œsophagus, situated $\frac{3}{4}$ in. above the Sternal Notch.—J. L. Irwin Moore.—Shown at the Section meetings on November 6, 1914, and May 7, 1915, to illustrate the benefits of Dr. William Hill's styletted oro-oesophago-gastric feeding-tube. The patient was so comfortable with the tube that he could not be persuaded to return and have a new one inserted. A few days

¹ In the necrotic tissue specially prepared sections show the presence of short streptococci and fusiform Gram negative bacilli (Dr. Eastes' Laboratory of Pathology and Public Health).

after the last report on the case the tube became blocked, and all attempts to unblock it failed; it was therefore removed. The rubber was found to have perished, the tube had been flattened by the pressure of the growth, and the wire stylet broken and corroded. Three days later the patient came to town, but it was found impossible to insert another tube through the stricture, nor could even the smallest bougie be passed. Gastrostomy was therefore performed two days later, but the patient only survived eighteen days.

This case is interesting in showing that: (1) A patient suffering from malignant stricture of the œsophagus, which would only admit a small catheter, may be kept alive for eight months and satisfactorily fed on semi-solid foods, *per vias naturales*, by means of this tube passed through the stricture with the aid of the œsophagoscope. The loss of weight was slow, being only 1 st. 8 lb. during the eight months, compared with 2 st. 9 lb. during the two months preceding the intubation.

(2) The operation of gastrostomy, which would otherwise have been necessary when the patient was first seen in September, 1914, was postponed for eight months, during which time he was able to lead a cheerful life, enjoy his food, attend to his business as a traveller, and lay by some money for his family.

(3) As Dr. Hill points out, the tube has a gradual mechanical dilating effect on a stricture. In this case, after insertion for a few days, the patient was able to swallow liquids and even semi-solid foods alongside the tube. After the tube had been inserted for seven weeks and then removed, he was able to swallow food without any tube for nine days. Again, the copious secretion of saliva and mucus, which in these cases causes such distress to the patient, was greatly reduced and relieved by this method of intubation.

(4) The tube should not be left *in situ* too long before a fresh one is inserted. A change every three months appears to be advisable.

Bullet Wounds of Face and Neck.—W. Stuart-Low.—*Case I.*

A soldier who was wounded on June 1, 1915, at the battle of Ypres by a bullet which entered over the right side of the nasal bridge, passing through the right maxillary antrum, the roof of the mouth, the tongue, and the left ramus of the lower jaw, and out at the left side of the larynx. The jaw was fractured, and having been very skilfully wired by Dr. James, has united firmly. The right antrum was quite dark on transillumination for some weeks, no doubt due to a blood-clot, but it is now clearer.

CASE II.—A soldier wounded in Flanders by a bullet which entered on the right side of the neck and passed out on the left side. It must have injured the larynx, as he now has a web occupying nearly half the glottis and greatly impairing his respiration and vocalisation. An expression of opinion as to the best method of removing this membrane is desired.

Notes of the case.—While kneeling and firing in a trench during a charge he felt a sudden pain in the right side of his neck, which he at first thought was nothing but a blow from a flying piece of earth or stone. Shortly after he felt the blood trickling down the neck, and found that he was speechless, being unable to reply to the questions asked by his corporal. Stretcher-bearers found him, and applied a first-aid dressing, and he was able to walk back about four miles to the casualty station, where his wound was more carefully examined. The bullet wound of entrance was found to be in the neck, about $2\frac{1}{2}$ in. below

the right ear, passing through just anterior to the border of the sternomastoid muscle, probably through the larynx, and emerging from the neck on the other side at a slightly lower level. At the casualty station he was inoculated with anti-tetanic serum soon after admission, but on the second day it was necessary to perform a tracheotomy. He was kept in the hospital in France for about a month, and then sent over to Fort Pitt Military Hospital. Shortly before leaving France the tracheotomy tube was removed. He was admitted at the Central London Throat, Nose, and Ear Hospital on October 19, 1915.

The PRESIDENT: I consider that these are extremely difficult cases, and that some operation will be needed. My choice would be laryngofissure.

Dr. PETERS: I think the second case should be left alone. Probably the web will thin out considerably, and if, later, removal become necessary, it will then be a simple matter.

Dr. DAN MCKENZIE: I think diathermy will get rid of the web.

Paralysis of Left Vocal Cord from Bullet Wound of Neck.—Dan McKenzie.—The patient, an officer, received his wound in May of this year in Gallipoli. Immediately after receiving it he became aware that he could only speak in a whisper. The wound healed up in three weeks and the voice has returned, so that he can now converse comfortably, although shouting soon tires it. Laryngoscopy shows the left cord to be paralysed.

There are two questions of interest in the case. First, the cause of the paralysis. The bullet (from a rifle) entered the neck in the middle line behind, opposite the fourth cervical vertebra (as nearly as I can make out), and emerged in front at the anterior border of the sternomastoid, at a spot midway between the upper edge of the thyroid cartilage and the hyoid bone. At this level obviously it must have been the left vagus itself which was severed, and that without any apparent injury either to the carotid vessels, to the internal jugular vein, or to the sympathetic cord. The pulse is normal in rate and rhythm.

The second question was put to me by the patient. In civil life he is a barrister, and he is anxious to know whether, when he returns to ordinary life, he will be able to use his voice in court. In other words, what is the prognosis as regards the strength of the voice after the onset of paralysis of one vocal cord?

It has been proposed that the vagus should be cut down upon and re-united.

The PRESIDENT: I think an exploratory operation is needed in order to see if the vagus has been cut across. Where there is possibly only bruising and suspension of function, perhaps for a long time, that is the first course to think of before deciding on further measures.

Closure of Nasal Fistula by Grafting over a Displaced Middle Turbinal.—Andrew Wylie.—Patient was injured by a bullet which entered near the outer angle of the eye and made its exit by tearing through the right nasal bone, leaving a large opening. Several operations were performed to close this opening without success. I cut the middle turbinal at the posterior end and pushed it upwards into the opening, leaving a small part attached. The outside was covered by a skin graft from the arm. This plan proved a complete success.

Shrapnel Wound of Nose and Cheek.—**L. H. Pegler.**—The patient is a soldier, aged twenty, who received the injury last June. The fragment passed across the face from behind forwards, throwing down a flap of tissue below the right lower eyelid and passing through the nose, carrying away much of the central part. Plastic operations have been performed at a provincial military hospital. The sight of the right eye is lost. Both ears were suppurating when the patient came to London; this has now ceased. The right nasal fossa is obstructed, but the patient refuses any operation.

The **PRESIDENT**: I think improvement can be brought about by forcible dilatation under an anaesthetic and making some cuts, a plug being passed daily, as has been done in some cases of congenital syphilis.

Dr. PEGLER (in reply): Two or three plastic operations have been done by the surgeons at Netley, a flap having been turned in from the cheek, but the patient pleaded that he was tired of operations, and positively refused even the restoration of free nasal breathing, which I was anxious to give him, and for which he had been sent to hospital.

Empyema of Right Frontal Sinus.—**L. H. Pegler.**—The patient is a soldier, aged twenty, with suppuration of anterior ethmoidal cells and frontal sinus on the right side of twelve months' duration. It had been obscured by an extreme vomerine deflection of the septum. The disease was not diagnosed till sub-mucous resection had been performed, though some discharge had been noticed by the patient. The pain complained of around and over the right eye is slight. The principal subjective symptom is giddiness. Patient is subject to fainting fits on slight provocation. Irrigation brings away a formed mass of purulent material about the size of the right frontal sinus space. The right antrum is not involved. A skiagram is shown.

The **PRESIDENT**: I should be inclined to make a larger opening into the frontal sinus, and with washing out and drainage, improvement ought to follow.

Postscript by Dr. Pegler.—The fronto-nasal canal has, since exhibition, been enlarged by Dr. P. Watson-Williams' method, and the patient has thereby been enabled to wash out his sinus himself with corresponding benefit, though some discharge continues.

PROCEEDINGS OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION.

Held in Atlantic City, New Jersey, May 25-27, 1914.

(Continued from Vol. XXX, p. 496.)

Recurrent Lymphomata of the Laryngo-pharynx—Presence of Streptococcus Hæmolyticus in the Growths Excised and in an Associated Spheno-ethmoidal Discharge—Autogenous Vaccination—Arrest of Recurrence—Recovery.—**W. E. Casselberry.**—A causal relationship between nasal sinus disease and tonsillar and other lymphoid enlargements of a certain type, prone to affect parts

over which the discharge flows, is substantiated, to the extent at least that manifold extreme enlargements of isolated lymphoid glands of the laryngo-pharynx were found to have been excited and maintained in chronic form by infection with *Streptococcus hæmolyticus* derived from a spheno-ethmoidal discharge which contained the same organism. The fact is significant in connection with the modern conviction that rheumatoid, cardiac, and pyæmic diseases lead out from local foci of infection, as it shows the necessity of searching for the focus "higher up" than the tonsils, since tonsillar infection itself may be secondary to nasal sinus disease. It supports also the conviction that secondary infection is the cause of the gross hyperplasia of the follicles in the fossa of Rosenmüller, and of the lymphoid infiltration of the folds of tissue about the Eustachian tube, which are observed in connection with sinus discharge, and which lead to deafness by obstruction.

The term lymphoma is used synonymously with infectious lymphoid swelling. In size and shape they were not unlike clusters of large white grapes, ranged on each side of the laryngo-pharynx, where they filled the pyriform sinuses, overrode the arytenoids and encroached upon the lumen of the larynx. There were in all six separate and distinct growths arranged in three pairs. Each of the upper pair consisted of two lobes, one above, the other below the side of the epiglottis, and was attached to the pharyngo-epiglottic fold. The middle pair, somewhat smaller, was attached to the aryepiglottic folds, and the lower still smaller pair to the arytenoids; the latter suggests that other instances of slighter degrees of hyperplasia about the arytenoids, observed in sinus suppuration, and classed as chronic laryngitis, really represent secondary infection of the lymphoid glands by the sinus discharge which gravitates to that situation.

The faucial tonsils having been totally enucleated years before, would have caused the upper pair of lymphomata, only their upper lobes at first being visible, to have been mistaken for compensatory growths, were it not unprecedented for the isolated follicles in the laryngo-pharynx so late in life as fifty-four years of age, to develop spontaneously without definite cause into overgrowths so unusual in multiplicity, size and situation.

Meanwhile the microscopist reported: "A simple hyperplasia of lymphoid tissue corresponding to that of the tonsil. No evidence of malignancy." And the bacteriologist reported the presence in the tissue, in large numbers and almost pure culture, of *Streptococcus hæmolyticus*, the same organism which recently had caused epidemics of severe acute infection of the throat and cervical lymphatic glands, and reported also that the spheno-ethmoidal discharge contained, among others, the same organism.

Nine months from the start the dyspnoea, choking spells, and impairment of voice required surgical relief, and all but the right one of the middle pair of growths were removed. But they soon re-developed, despite external exposures to the X rays.

It was in face of this discouraging prospect that hopes were centred upon autogenous vaccination. All other treatment was suspended, and despite the fact that one of the middle pair had not yet been removed surgically, it was now left to serve as a gauge by which to mark the efficacy of the vaccine. Its successful effect furnished practical confirmation of the infective origin of the growths. The result of the first dose was comparable only to that at which one marvelled in the early days of diphtheria antitoxin. The change commenced within twelve

hours, with relief from irritation in the throat, and was marked within two days by a visible diminution in size of the lymphoma which had been let remain as a gage, and of the large recurrent growth at the site of the first one removed. The further recession under bi-weekly doses was uninterrupted down to a practical and permanent disappearance of all the growths in about six weeks.

JOSEPH L. GOODALE: I am very much interested in this case, as I am reminded of one I saw several years ago, which I reported the following winter in Philadelphia, and which bears certain resemblances in this respect. A woman I was asked to see showed an enormous enlargement with induration of the left tonsil, the induration continuing behind the tonsil and without any sharp line of demarcation to the base of the tongue and down the vault to the larynx, rapidly increasing so that from the beginning of the symptoms to the time when I saw her it had produced actual dysphagia, and the question was whether we should do a tracheotomy or remove the growth, and in examination under ether the growth was found so extensive that we decided to let her come out. During the next week, although we had practically decided the condition was hopeless, we endeavoured to excite an auto-genous vaccination by the injection of turpentine under the skin. That was perhaps the wrong thing to do. At the same time we gave her the *Staphylococcus aureus*. The result was that within three days she was able to swallow. Within a week she could breathe perfectly. This was in May; when I went away the last of June she had left the hospital, and examination showed nothing in the situation of the former growth. When I saw her again in the autumn the site of the growth was represented by a stellate cicatrix. She then disappeared from observation; I saw her last spring; she has been in perfect health, no difficulty of any sort, but at present there is not the slightest sign of lymphoid tissue in the tonsil fossa. It looks as though a complete and beautiful enucleation had been performed.

WILLIAM E. CASSELBERRY (in closing): The spheno-ethmoidal discharge during the course of the treatment diminished tenfold. It never was entirely eradicated, but it is now so slight in comparison that the patient esteems it as not one-tenth of its previous quantity. There has been no further treatment. With regard to the removal of the growths, the upper ones were done without a mirror, by extreme depression of the tongue with the patient's head directed upward, getting hold of the growth with a volsellum and pulling it up and getting the snare up. The fourth was done in much the same manner, but under the mirror. Grasped first with the volsellum under laryngoscopic observation, and then the snare put over it, also with laryngoscopy. The patient started to gag, the mirror was removed, and under traction the snare was drawn home. The others were simple enough to do without traction under laryngoscopic observation.

Radium in Papilloma of the Larynx in Adults.—F. E. Hopkins (Springfield, Mass.).—Dr. Clark's paper, read before the Association in 1905, brought out very clearly the tendency to spontaneous disappearance of papilloma of the larynx in children when the age of active growth has passed; but the tendency toward recurrence is more persistent, and is a more desperate one in the adult. Radium has been applied directly to the larynx in no great number of cases as yet, but with some positive cures reported. More than a single application may be necessary, and burns from too long exposure with consequent adhesions and contractions

are possible. Caution is advised as to the length of exposure when a powerful tube is used, and a necessity for more than one application is to be borne in mind.

HENRY L. SWAIN: Dr. Abbe stated in New Haven recently, in speaking of the treatment of tumours by radium, that he had one case without recurrence after five years. It has occurred to me since I have been using suspension laryngoscopy, that we have in it an admirable method of exposing these papillomata over long periods to radium. The patient is hung up with an anæsthetic, and kept so comfortably for so long a period that we can radiate them at our pleasure. Dr. Mayer exhibited patients under suspension laryngoscopy. The other day I had a case hung up for over an hour with insufflation anæsthesia through the nose, breathing perfectly and without any after-discomfort.

D. BRYSON DELAVAN: Radium is especially applicable to superficial growths, and papillomata of the larynx are very frequently of this class, and should be susceptible to relief from the use of radium. Without some such help as suspension laryngoscopy, it is practically impossible to make an exposure of the radium for sufficient time to answer the purpose. I have had under observation for six or seven years a little girl, a case of Dr. Abbe's, whom I began to treat with him when she was about five years of age. I refer to the case, not because it has been an inveterate case of papilloma, but because the radium has not been as effective in this instance as in almost every other case I have seen, and I would particularly refer to one result—not of the radium treatment, but one which has followed in the case perhaps from influences due to the growth itself—that is, the distinct contraction, especially of the epiglottis; a contraction so marked as to be quite unusual. There still remains a large mass of papillomatous tissue at the base of the epiglottis, and the child is still able to breathe most of the time through the mouth, but is occasionally forced to resort to the laryngeal opening, which is kept packed. The contractures which have arisen are worthy of attention.

FREDERICK E. HOPKINS (in closing): I think I may fairly say that my conversation with Dr. Abbe makes me feel one can speak much more positively about the efficacy of radium than I felt warranted in stating from my own experience in my one case. He has used it for fully ten years, and has many cases of undoubted cure. The woman referred to, who was treated so long, has since died, but she lived for three years after the application of radium, dying with pneumonia, I believe, and during that period of three years she breathed comfortably, with no recurrence of the growth.

Septic Infection of Parotid Glands.—F. E. Hopkins.—Structure and anatomic relations account for the prominent symptoms attending great swelling of the parotid gland. Each intra-lobular duct is a branch of a subdivision of the main duct, so that if a septic infection results in closure of these ducts, drainage is impossible, and dissection of the gland becomes necessary. Many important vessels and nerves, including the facial, traverse or originate within the substance of the gland, making dissection difficult and dangerous. The gland lies in contact with internal jugular vein and internal carotid artery, and the pneumogastric, glossopharyngeal, and hypoglossal nerves; and pressure of the distended gland causes corresponding functional disturbance. Suggests—

tions for treatment are early probing of Steno's duct and efforts to reduce inflammation, which, failing, dissection of gland becomes necessary.

A Case of Bilateral Blindness and One of Unilateral Scintillating Scotoma Cured by Operations on the Ethmoid Cells.—Hanau W. Loeb.—Case 1 was that of a boy who was practically blind, the vision being reduced to $\frac{1}{102}$ on the right side and $\frac{3}{120}$ on the left side. The sight had been gradually failing for three weeks. This was accompanied by severe supraorbital headache. Exenteration of both ethmoids was followed by complete restoration of vision within one week, improvement being gradual from the time of operation.

Case 2 was that of a girl, sixteen years of age, who had been suffering for two years from daily attacks of severe left-sided headache, with what she described as flashes appearing in her left eye. These attacks lasted for about five minutes, coming on without any apparent regularity during the day, and without any cause ascertainable on the patient. Exenteration of the left ethmoid resulted in complete cure, the patient having suffered only a mild attack on the day of the operation.

Dr. Loeb thinks that these cases, in which the ethmoid and not the sphenoid was at fault, may confirm his investigations on the anatomy of this region, to the effect that under ordinary circumstances the optic nerve is in close relation with the ethmoid labyrinth only at the postero-external angle of the last posterior cell. Where this relation exists, there is only the slightest possibility of any danger to the optic nerve in suppuration confined to the ethmoid cells. But when the last posterior ethmoid cell replaces the sphenoid, the optic nerve runs close to and along the external wall of this ethmoid cell (as in two out of thirty specimens studied), and the vulnerability of the nerve is correspondingly heightened in view of the greatly increased portion exposed.

Dr. JOSEPH H. BRYAN: In my experience it is the posterior ethmoid cells which are most at fault at the juncture of the sphenoid, or the posterior ethmoid cell acting on the optic nerve as it comes through the canal. These cases where the wall between the sinus and the orbital cavity is very thin, naturally may be due to some pressure effect, but when distantly situated, with considerable bone between the cavity and the nerve, it is rather difficult to explain, unless due to toxins, and it is my belief that there is some transmission of the septic matter to the nerve tissues which bring about these changes.

Dr. JOHN H. BARNHILL: In a study of this question I came across a specimen which was unique. I could well believe that anything could happen to the optic nerve in a case of ethmoiditis posterior in such an instance. The specimen shows that the whole optic canal runs entirely through one of the posterior ethmoidal cells much as would a sewer drain run through the ground. It is attached at the base of the cell, and three-quarters of the circumference of that osseous tube runs directly through. It seems incredible, looking at the very thin bone which surrounds the bones throughout this half inch in length, that if this cell were filled with pus and the drainage impeded, such an eye would not be affected in some way, as Dr. Loeb has explained.

Dr. B. ALEXANDER RANDALL: I have seen a good many of these cases, some of them of great interest; but all of these where the scotoma was scintillating, I have seen to be distinctly toxic in type and not dependent on anatomic relations. I have seen the blindness and fixed scotoma quite marked, with marked swelling of the optic nerve.

Dr. HANAU W. LOEB (St. Louis), in closing: Ethmoid disease is more common than sphenoid disease, and when the latter sinus is affected the ethmoid is also, especially in the acute conditions. I found in these anatomic studies that the last posterior ethmoidal cell at its postero-external angle came the nearest to the optic nerve. Knowing, as we do, that the orifice of that is low down and almost always empty of pus, with that slight relation it would not affect the nerve to any considerable extent, even if it is possible for the nerve to be affected by nearness. However, in two cases out of the thirty specimens, this nerve, instead of having that relation on account of the ethmoid cells being pushed back over the sphenoid, ran along the posterior ethmoid cell and along its lower portion, and was in a far more vulnerable position than before. Onodi has ascribed to the toxic condition the cause of optic troubles, or to the veins. Toxic conditions can act more accurately under these conditions than when distant. The anatomic relations of these structures have shown that this condition obtains.

Too Optimistic Rhinology.—B. Alexander Randall (Philadelphia).—Important, often essential, as is rhinology to laryngology and otology, it is often inadequate, and must be supplemented by strictly ear treatment in ear cases, where exhaustive diagnosis may show other conditions, such as nerve deafness, outweighing the catarrhal phases. The aurist sees many cases harmed rather than helped by rhinologic treatment alone. "It is a narrow and distant view of the ear that is gained with the throat mirror only." The catarrhal process originating in the nose and naso-pharynx may be impossible to cure unless these be put in order; but may progress unchecked, or at least persist, despite the best work here. Deafness sometimes clears up after adenoid removal; but "signing the pledge will not cure a hobnail liver."

Intrinsic Cancer of the Larynx; Complete Excision Apparently Effected by Endolaryngeal Operation.—Sir StClair Thomson (London).—The treatment of intrinsic cancer of the larynx by laryngofissure is remarkably satisfactory. The writer never lost a patient by operation, and 80 per cent. have remained free from recurrence; similar results were secured by Semon and Butlin. Thomson records his first case of endolaryngeal cancer that he has treated in a woman, aged fifty-three, hoarse for eight months. The right vocal cord, from the anterior commissure back to the vocal process, was replaced by a reddish cauliflower growth, interfering somewhat with the movement of the cord. Under cocaine, with a large Mackenzie forceps and the indirect method, as large a piece of the cord as possible was evulsed. It proved to be epithelioma. Some time later anaesthesia was induced by intravenous infusion of ether and hedonal. Laryngo-fissure; removal of the right cord ventricular band with their perichondrin, together with the vocal process of the arytaenoid cartilage. Examination of this mass showed no evidence of epithelioma, indicating that the entire diseased mass had been removed at the first operation.

This writer concludes:

(1) Cancer of the vocal cords in the early stages is strictly limited and very slowly progressive.

(2) Diagnosis is based chiefly on inspection of the larynx. Where the growth is superficial and not infiltrating it can be confirmed by microscopic examination.

(3) The growth may be completely removed endolaryngeally, even when it occupies the entire length of a vocal cord.

(4) Laryngo-fissure is the operation of choice in all cases of endolaryngeal cancer, is not a dangerous operation, and offers the best prospects, because the disease remains superficial and limited for a time, and finally there is a lasting cure in 80 per cent. of the cases. The value of indirect laryngoscopy is strongly insisted upon as being far gentler than the direct method, and it is hoped that the rising generation of throat surgeons will continue to practise the indirect method.

The anaesthesia given in the case cited, while perfectly ideal from the operator's point of view, gave much anxiety subsequently, as it was difficult to rouse her for twenty-four hours after. In recent cases he has returned to chloroform.

DR. CHARLES W. RICHARDSON: The laryngo-fissure claims to have its origin from Dr. Sanger of Berlin, but the first I heard to mention that manner of removal of laryngeal growth was Dr. J. Solis-Cohen. Whether he is the originator of it he can tell us. One case which I have had is now five or six years without any recurrence. Most of my others have had recurrence, but, singular to say, only one of recurrence *in situ*. There were secondary developments in other portions of the body to which they have succumbed. I have had two this winter—one that I operated on in the latter part of November or December—and as I had to go down quite far into the cricothyroid membrane in order to insure absolute removal into normal tissue, there has resulted some stenosis. This has been intensified by the fact that I had a hæmorrhage at the end of operation; not a very severe one, but a persistent oozing in the lower corner between the arytenoid and the lateral wall of the thyroid cartilage requiring opening up of the wound and watching of the hæmorrhage for some little time. As a last resort, I had to use chromic acid, which also produced considerable softening and necrosis of the left wing of the thyroid cartilage, which no doubt has produced this stenosis. He is wearing an intubation tube, and is perfectly comfortable without any recurrence, but is so distressed at his inability to get rid of the tube that he has gone to consult some of my colleagues at Johns Hopkins. The second case of this year was identical with the first, and there was an identical hæmorrhage which was controlled much earlier than in the first case. After I had controlled the hæmorrhage and waited about half an hour, I returned to the man to see if he was perfectly safe to leave, and I found that he did not seem to recognise me, or show any interest in anything. In picking up his hand to feel his pulse I noticed the left arm was apparently inactive, and testing further I found the left arm and leg both inactive; the right side was free! Three or four days later he died from his hemiplegia; no *post-mortem* was obtained. He was a man of seventy years, and probably this was a natural sequence in such a case. All of my cases I have operated on without primary tracheotomy, simply laryngo-fissure according to the technique suggested by Cohen, splitting the larynx and making the muco-perichondrial separation so far back as the growth extends in every direction and cutting off the mass.

DR. J. SOLIS-COHEN (Philadelphia): I have done a number of these operations and have never seen a recurrence. I learned to split the larynx from our old member, Ephraim Cutter. I saw him in Boston take out a large epithelioma in 1867. This man lived for twenty-five years and died of apoplexy. My operation differs a little from his. I cut down, make the incision through the perichondrium all around the growth,

and then with a blunt elevator lift the parts up. Then with a curved serrated scissors the whole mass is taken up, perichondrium, mucous membrane, and growth, and the growth itself is not touched at all with any instrument. I have done preliminary tracheotomy in my earlier operations, but I have done one or two cases without. I prefer preliminary tracheotomy because I think it is well to get the patient accustomed to the use of a tube in case this becomes necessary later. All my operations were performed under chloroform. I heartily endorse the conclusions that have been presented in the paper, both as to the ease with which certain classes of growth are removed by intra-laryngoscopic method, and the conclusions that have been arrived at by the writer. Hemorrhage has been insignificant in my cases.

Dr. EMIL MAYER: As a new contribution to the question of anæsthesia I would like to call attention to the anæsthesia proposed by Gwathmey of the injection of ether into the intestinal canal, producing a perfect anæsthesia, the excess being drawn off after the operation. This is still in its infancy, but is very well spoken of, and it may be possible that in this we have a newer method of producing anæsthesia, avoiding the necessity of a preliminary tracheotomy, and operating under ether.

Dr. D. BRYSON DELAVAN: Again, I am proud and happy to know that America is still in the lead, but as to the subject of thyrotomy it is necessary to mention the name of Clinton Wagner, whose cases in the eighties show a comprehension of the subject and success in relation to it which is deserving of recognition to-day. With regard to the recurrence of malignant disease in these cases after operation, it is quite true that recurrence is unusual, yet I have seen several cases in which it has taken place. There is one case in particular, of primary epithelioma of the epiglottis, in which the disease was apparently far and widely removed, in which the patient lived for nine years without recurrence, then it took place and he succumbed. The fact that recurrence does not take place in many cases cannot insure the patient against it. It seems possible to me that where it should take place is in the cases that have not been appreciated as of the severe type, or else that the operation has not been thoroughly performed, but in the main the experience has been such as that stated in the paper and by Dr. Cohen.

Dr. T. PASSMORE BERENS (New York City): I wish to lend emphasis by referring to this case of Sir StClair Thomson. He said he had removed his growth entire by the indirect method. In a case that I reported about six or seven years ago, at the same time Dr. Richardson had his, I also removed the cancer entire by the indirect method. There was so much induration following the operation that I did a laryngo-fissure and hemilaryngectomy, removing the whole wing of the thyroid. The growth I found during the laryngo-fissure proved to be simply inflammatory. The cancer itself was removed by the indirect method. The man has made a perfect recovery. A patient should be prepared for operation by being taught to lie on his stomach, well over toward the side of the bed, with his elbow on a chair, and taught to swallow upward. This has added greatly to the comfort of the patients, and, I believe, also to the quickness of their recovery.

Dr. GREENFIELD SLUDER: I would like to add a final word in the form of a plea for the indirect method. I personally regret exceedingly to hear it spoken of as a lost art.

Dr. HARMAN SMITH: I think we are indebted to StClair Thomson

for giving us the history of this peculiar and interesting case. It is not always that our foreign confrères are willing to submit to our consideration and discussion their most important and unique cases. This is a comparatively young woman, removal by the indirect method, although an accident, being complete in its character, recurrence of a granuloma, which to the majority of us would simulate a recurrence of the growth, his absolute faith in the pathologist that it had been removed thoroughly, not losing his head and removing the large mass which recurred, all these points seem factors that stand out prominently in the history of this case.

Dr. JOHN E. MCKENTY (New York): It seems to me, so far as my experience goes, that in small unilateral growths of the larynx laryngo-fissure is sufficient, but where the growth is at all progressive or extensive, or growing fast, I am in favour of removing, not only the growth, but the cartilage underlying it, either taking a wide section out of the larynx or doing a hemilaryngectomy. I do the tracheotomy and the hemilaryngectomy at the same time, and in that way may probably be going against the experience of others, as it is generally considered better to do the tracheotomy first; but if done through a small incision just above the suprasternal notch, and the laryngectomy through an incision which does not connect with the fissure below, there is not much trouble. Another point, to prevent inhalation pneumonia, is that after doing the hemilaryngectomy I pack the trachea tight down upon the tube with vaselined gauze impregnated with bismuth, then I use a small drain into the larynx brought out at the lower corner of the laryngo-fissure wound. In that way the larynx is drained of secretion, and this secretion is prevented from getting into the lung and causing pneumonia. I do not believe the position in bed is sufficient to prevent this when the larynx is closed after hemilaryngectomy. The drainage is removed from the larynx in two days, and the gauze packed down on the tube is removed also, and the intubation tube taken out four days after the operation. I have had four cases prior to the two recent ones, of which I will not speak, in which the patients made excellent recoveries, and have been able to talk in a loud whisper. I think we ought to be very proud of the fact that Dr. Solis-Cohen has opened the way of doing laryngo-fissure, and has given us this excellent operation in cancer of the larynx. Anything that will avoid total laryngectomy is a godsend. I saw in a clinic abroad two years ago thirteen total laryngectomies, and the patients were, in many instances in a pitiful condition. The operations were all successful so far as the immediate result was concerned—the Gluck operation was done—but the pathetic condition of the patients struck me that life would hardly be worth living after a total laryngectomy, and if we can get results by an early operation, such as Solis-Cohen and Sir StClair Thomson have told us of, we will be very glad to adopt these methods instead of the more radical ones.

(To be continued).

Abstracts.

PHARYNX.

Anderson, H. B. (Toronto).—Appendicitis as a Sequela of Tonsillitis. "Amer Journ. Med. Sci.," October, 1915.

The occurrence of appendicitis as a sequela of tonsillitis has, in the author's opinion, received less notice from clinicians in America and Great Britain than its practical importance warrants. Since Kelynaek in 1893 first drew attention to the relationship between the two diseases, many cases have been reported which tend to show that appendicitis is often of hæmatogenous origin, and that when such is the case the primary source of infection is not infrequently the tonsil. One writer, Kletz, even goes so far as to say that in his opinion almost every case of appendicitis is in causal connection with angina through hæmatogenous infection.

The author reports three cases in which this connection appeared to be clearly established. He draws attention to the tendency shown by such cases of appendicitis to run an atypical course and, "after smouldering, suddenly to develop fulminating symptoms." The diagnosis is, moreover, rendered difficult in some of these cases of hæmatogenous origin by the fact that local tenderness and rigidity in the right iliac region of the abdomen may be entirely absent, a condition rarely observed in acute appendicitis.

Thomas Guthrie.

NOSE AND NASO-PHARYNX.

Bryant, W. Sohier.—Transitional Epithelium in the Rhino-pharynx. "The Laryngoscope," 1915, p. 346.

Bryant has investigated the position of the boundary line between squamous and ciliated epithelium in the naso-pharynx. In this boundary line the epithelium is cuboid, with imperfect cilia or none at all. In all specimens examined (rabbits, guinea-pigs, cats, macacus and cebus monkeys and human beings at various ages) the squamous epithelium of the oro-pharynx extends as far forward and upward as the fossæ of Rosenmüller, and the boundary zone occupies the region of the Eustachian orifices. The intermediate zone lies in a wavy ring round the rhino-pharynx, and marks the line between the free air portion and the repeatedly washed portion of the rhino-pharynx; the latter is, of course, exposed to friction and pressure as well as to the materials of digestion. It has been observed clinically and experimentally that when ciliated epithelium has been destroyed over an area, it does not become wholly replaced—its place being taken by squamous epithelium. Bryant warns us of the damage done by the application of strong reagents to the ciliated region of the rhino-pharynx.

J. S. Fraser.

ŒSOPHAGUS.

Goffe, E. G. L.—Perforation of the Arch of the Aorta by a Safety-pin Impacted in the Œsophagus. "Brit. Journ. of Children's Diseases," No. 134, vol. xii, February, 1915.

The case history of an infant aged ten months, who, having never previously been ill, was admitted to a fever hospital certified as suffering from scarlet fever. The next day the child vomited a large quantity of blood after a feed of milk, and died. At the *post-mortem* it was found

that the child's death was due to the presence in the cesophagus of a brass safety-pin $1\frac{1}{4}$ in. long, the point of which was found to have perforated the gullet-wall in a downward direction $1\frac{1}{2}$ in. from its upper extremity, and after having traversed a space 1 in. in extent, to have perforated by ulceration the posterior wall of the aorta $\frac{1}{2}$ in. below the origin of the left subclavian artery. Bleeding took place into the cesophagus. From investigations made it appeared probable that the pin was swallowed about three weeks before death.

J. B. Horgan.

E.A.R.

Samuel J. Kopetzky.—**Atypical Sinus Thrombosis.** "The Laryngoscope," 1915, p. 165.

Kopetzky classifies cases of sinus thrombosis into (A) Typical and (B) Atypical.

(A) In dealing with the typical cases Kopetzky divides cases of mastoiditis into three groups: (1) The coalescent type of mastoiditis; (2) the hæmorrhagic type; and (3) the component lesions of chronic mastoiditis, including cholesteatoma cases and those with an acute exacerbation supervening on a chronic suppuration.

(1) In the first group the disease generally reaches the sinus wall by contact, and granulations spring up. At a later stage the sinus wall may be eroded or opened, so that its interior is in communication with the mastoid abscess. In this group, then, pachymeningitis externa first occurs; next, thrombosis takes place in the interior of the sinus, and the thrombus becomes infected secondarily.

(2) In the hæmorrhagic type the bony structure of the mastoid process is not generally broken down. There may be destruction of bone around the antrum, but most of the mastoid cells maintain their bony walls intact. In these intercellular bony structures there are small veins which become phlebitic or thrombotic. Through these small veins the sigmoid sinus becomes infected. This hæmorrhagic type is well seen in true influenzal infections. In this type the sinus wall does not generally throw out defensive granulations as the sinus infection develops from within the blood-vessels. As one would expect, in this group the sinus wall has at first a normal appearance, and only late in the course of the disease does it appear thickened.

(3) In the chronic cases the sinus is reached by extension of the bone lesion or through contact with purulent tracts ramifying through the diseased bone. In this group the sinus wall rarely presents a normal appearance.

(B) The atypical forms of sinus infection occur in cases of acute mastoiditis, especially in young people. There are two groups.

(1) Cases in which the tympanic floor is deliscent, so that the tympanic mucosa is in direct contact with the dome of the jugular bulb. In these cases virulent micro-organisms may pass through the tympanic floor by way of the small veins which open into the anterior chamber of the dome, and by reason of the peculiar swirl which the blood-stream makes in the dome, give rise to the formation of a primary bulb thrombosis. In such cases the wall of the sigmoid sinus appears normal.

(2) In some cases of acute middle-ear inflammation the infection rapidly reaches the sinus because of mal-development or non-development of intervening bony structures—*i. e.*, primary sigmoid sinus thrombosis develops as the sequel of the tympanic infection. In this group the sinus wall, which is very far forward, usually appears normal.

Kopetzky then gives a brief *résumé* of McEwen's work on the venous channels connected with the petro-mastoid bone.

Clinical Aspect.—If the otitis media spreads to the mastoid process, it gives rise to signs characteristic of the tissues involved. In the so-called "painless" type—the coalescing form of mastoiditis—[A (1)] the pus flows in great amount from the external auditory canal, and finally, when the disease reaches the cortex, the periosteal covering, which is sensitive, gives rise to pain, and so calls attention to the ear. The subsequent onset of pyæmic temperature points the way to cure.

In the form with an abnormally far forward sinus [B (2)] there is no anatomical structure in the mastoid to give rise to symptoms; as there are no mastoid cells to cause purulent exudate there are no lesions to eventually reach the cortex and make it sensitive to pressure. In this group there is a small antrum and no cells, the mastoid process being mainly occupied by the sigmoid sinus. The external contour of the mastoid process, however, would lead one to expect the usual anatomical structure. Sinus phlebitis and thrombosis here arise by direct invasion of the blood channels from the small veins from the tympanic cavity. The entire meshwork of veins, instead of being spread out to embrace a normally constructed petro-mastoid, is contracted to hold the anomaly which the process presents. The onset of such cases is often that of a simple purulent otitis media, and either before spontaneous rupture of the drum membrane occurs, or just as it occurs, a septicæ-pyæmia develops. Usually these cases remain unrecognised, and are treated by the physician. The first serious complaint is of headache and chill, though eventually typical pyæmic symptoms arise. When joint lesions or multiple abscesses in the muscles develop, or when finally a septic endocarditis supervenes, the cases are regarded by the physician as quite straightforward. As a matter of fact, all these lesions are, of course, metastatic. [The abstractor had one case of the type [B (1)] which, for more than a week, was looked upon by a physician as "post-influenzal upset of the heat regulating mechanism."]

Kopetzky records the two following cases:

CASE 1.—Child of six years with chronic purulent otitis media (right) following scarlet fever. Sudden attack of vomiting with rise of temperature and pain in right ear. No complaint of left ear. *Radical mastoid operation:* Well developed mastoid process; cells filled with fluid pus and pseudo-cholesteatoma; knee of sigmoid sinus exposed and found healthy. Two days later temperature 102° F.; restlessness with pain in operated ear. Next day normal temperature, but pulse 104. Next day vomiting and restlessness, child tore off his bandages; temperature 101° F., pulse 122. On following day patient unconscious; temperature 102° F., pulse 132; no signs of meningitis. *Second operation:* Dura of middle fossa and sinus quite normal; death later in the day. *Autopsy report:* Small hemorrhages in brain; sinus on right side healthy. The left sinus showed a yellow thrombus which completely filled the sinus from the knee to beyond the bulb. Thrombus partly organised. Left tympanic membrane intact, but middle ear contained pus. Antrum small, no other cells at all present. The mastoid process was composed of a thin shell of bone, and its interior was hollowed out to be filled by the sigmoid sinus. Kopetzky points out that on the right side there was a regular sequence of symptoms—mastoid pain, purulent discharge, etc.—and that this masked the onset of the phlebitis and thrombosis on the left side. The absence of symptoms from the left ear has been explained in the previous part of the abstract.

CASE 2.—Male, aged forty-seven, complained of severe headache for twenty-one days before admission. At the beginning of his illness he had a chill, followed by profuse perspiration, and had similar attacks for two or three nights thereafter. He was attended by a doctor, and the attacks ceased. On admission, temperature 103° F., pulse 114; diagnosis made, probably typhoid fever. At six p.m. the patient, who had gradually become semi-comatose, had a distinct chill; right drumhead white and lustreless; incision of the drumhead yielded pus. No sagging of meatal wall and no mastoid tenderness. *Mastoid operation:* Cortex normal, *sinus immediately presented close to posterior meatal wall;* retractor inserted between sinus and bone, and eventually mastoid antrum reached; antrum of normal size and contained granulations, but no fluid pus. Sinus wall normal, nevertheless plugs introduced between bone and sinus, one at the upper knee and one lower down. Intervening sinus wall incised, and cavity found to be occupied by red thrombus. Upper plug removed, but no bleeding. Internal jugular resected from $\frac{1}{2}$ in. above subclavian to above facial. Neck wound sutured. Free bleeding obtained a little beyond upper knee, but no bleeding from bulb. Gauze drain placed in bulb. Uneventful recovery. Kopetzky remarks that the absence of all mastoid symptoms in this case is characteristic of the anomaly of mastoid structure.

J. S. Fraser.

MISCELLANEOUS.

Myron Metzenbaum (Cleveland, Ohio).—*Scopolamine in Nose and Throat Operations.* "The Laryngoscope," 1915, p. 95.

Metzenbaum reports on the administration of scopolamine or hyoscyne hydrobromide as a preliminary injection before 2000 operations on the ear, nose, and throat. Adults were given $\frac{1}{100}$ th of a grain, usually by the mouth, from a half to one hour before operation under local or general anæsthesia. Children got $\frac{1}{200}$ th of a grain in pill form. Scopolamine acts as though it were made up of two radicals, one of which is similar to atropin. As children tolerate belladonna very well, they also tolerate scopolamine. Scopolamine does not, however, check the secretion of the kidneys or salivary glands, but greatly diminishes mucus secretion. The other radical of scopolamine is a decided brain sedative which changes pre-operative nervous fear and irritability into a condition of calm and quietude. Patients who have had scopolamine go under ether (or a mixture of nitrous oxide and oxygen gas) much more rapidly than usual. In nasal operations the preliminary administration of scopolamine lessens the amount and strength of cocaine which must be used. Scopolamine is free from any immediate or remote detrimental effects.

J. S. Fraser.

OBITUARY.

It is with deep regret that we intimate the death of two notable Spanish colleagues, Dr. Suncé y Molist, of Barcelona, and Dr. Gallegos, of Seville.

Dr. Suncé y Molist was one of the very few pure otologists in Spain, and was everywhere regarded as one of the great medical personalities of the Peninsula. His professional career began as long ago as 1868, and the enthusiasm and energy with which he applied himself to his life's work won for him a commanding position not only in his own country

but throughout the whole of Europe. A prolific writer, his literary gifts were used to good purpose not only in the large number of articles and papers which issued from his pen, but also in the editing of the *Internationales Centralblatt für Ohrenheilkunde*, of which he was one of the founders, sharing that distinction and responsibility with Dr. Brieger, of Breslau, and Dr. Gradenigo, of Turin.

Dr. Gallegos, who died at the early age of fifty-five, was a well-known Spanish laryngologist, whose organising powers won for him the golden opinions of his *confrères* on the occasion of the Medical Congress at Seville, in which he took a leading part. A medical man of lofty culture, his diagnostic and surgical skill was universally acknowledged to be of the highest quality.

REVIEWS.

An Index of Prognosis and End-results of Treatment. By Various Writers.

Edited by A. RENDLE SHORT, M.D., B.S., B.Sc.Lond., F.R.C.S.Eng., Capt. R.A.M.C., Hunterian Prof. R.C.S., Examiner in Physiology for the F.R.C.S., Hon. Assistant Surgeon, Bristol Royal Infirmary, etc. Bristol: John Wright & Sons. London: Simpkin, Marshall & Co. Ltd. Toronto: Macmillan Co. of Canada. 1915. Pp. 570. Price 21s. net.

Prognosis is of all the aspects of clinical work the one of which the practitioner is apt to fight shy, and the more experienced he is the more he endeavours to avoid touching on it. The writer remembers a highly respected consulting physician succeeding in satisfying a husband who anxiously inquired as to whether his wife would recover, with the reply uttered with the most solemn unction "I hope so." An Irish physician who was faced with the question "Will he get through the night?" is stated to have stifled further inquiry by the answer "I'll tell you better in the morning." A practitioner (who shall be nameless) in early days of general practice when dispensing was included, was called to a very old man who was apparently *in extremis* with well-marked classical "Hippocratic" countenance. He was so convinced that it was only a matter of a few hours that he said as much and further that *it was useless to give him any more medicine*. As no message as to the expected death arrived he found on inquiry that the old man had pulled round and was out of bed. We shall not dwell on the obvious moral. The same practitioner when engaged in discussing with a senior partner the condition of a young child and the possibilities of its recovery, was faced by the more experienced man with the exclamation "Couldn't you *see* that the child was rapidly sinking?" The faculty of *seeing* the general signs and portents, apart from academical details, had probably only been acquired by having previously made mistakes and *having remembered them*. The extraordinary powers of recuperation in children even when in what appeared to be the most desperate condition so impressed the younger practitioner that he was fain, when pressed, to take refuge in the somewhat exaggerated avowal that he would never look on a child as past recovery till it was "in its coffin and screwed down." This had the air of smartness and the touch of hyperbole which seems so gratifying to the Londoner's ear and, as it was merely a kindly and encouraging expression of ignorance, it was usually taken in good part.

In the inevitable uncertainty, it is only human to wish to let anxious

people down as gently as possible. Perhaps the most striking instance of the result of this policy was that of a young practitioner who had recently started in a provincial town and was called in, in the last instance, to see what he could do for an old gentleman who had been given up as hopeless by all the other practitioners in the town. With some trepidation and a consciousness of his youth and inexperience he, probably without realising the exact position of matters, blurted out that he thought the patient might pull through. This opinion was quite disproved by the patient's dying within the next few hours; our friend felt that he had made a complete *faux pas* and ruined his reputation in that locality, but to his astonishment he was called in shortly afterwards to attend a member of the bereaved family, and to his surprise and delight was informed by them that they had called him in because he was the only one who had offered them a single ray of hope with regard to their deceased father. *Si non e vero e ben trovato.*

A somewhat amusing instance of a mistaken prognosis was communicated to the writer by a German *confrère* in happier times. It was to the effect that a very eminent surgeon made his way into a crowded tram car when an elderly Jewish passenger saluted him most obsequiously and begged of him to take his place, saying that he was grateful to him for having saved his life. He went on to say that as he was lying in the hospital ward the surgeon passed the bed and uttered but one word and from that time the patient began to improve. When the surgeon asked if he remembered what the word was, he said he would never forget it; it was, in fact, "*moribundus*." I need hardly say that the surgeon pursued the subject no further.

In our books and lectures the prognosis of most diseases seems to be that they end "usually in recovery, frequently in prolonged ill-health, occasionally in death." A tone of conviction is sometimes imparted by the citation of statistics, usually the percentage of results obtained in a dozen or so of cases, and anxious relatives can at times be put off with such a recital. They do not know the fallacies which beset the statistical method, the unavoidable inaccuracy of registration returns, the straining after a name for the patient's disease, the results obtained from careful selection of cases for operation with the abandonment of some which, with less consideration for statistics, might have had a chance of recovery or relief, and many others with which we are familiar.

This Dictionary of Prognosis will be welcomed by those who desire to face these inevitable difficulties and to come as near the truth as possible, for their own satisfaction quite apart from the question of satisfying the demands of anxious relatives. The task the editor and his coadjutors have set themselves is by no means an easy one, and is recognised as such by them, but they have attacked it in the most serious spirit and have allowed no means of arriving at reliable criteria to escape them. The statistical method is employed where possible and affords valuable help within its limitations. The returns from Life Insurance Offices are drawn upon in some cases, and in others the carefully prepared records of the Bristol Infirmary. In this way the general prognosis of the disease under consideration is arrived at. Endeavours have been made to compare the prognosis apart from treatment with that obtainable after treatment. This ideal has been realised, perhaps the most happily of all, in the numerous articles contributed by the editor, Mr. Rendle Short himself. The many other eminent contributors have done their best possible and, as their names would lead one to

expect, their best is of the very highest quality. For the prognosis in any individual case the results of clinical observation are frequently invoked.

Though nothing will take the place of thoughtful, rational, and remembered experience, the methodical guidance given in this work will make its application very much easier, more purposive, and more reliable than it would otherwise be. The more our readers find themselves cornered by inquiry as to prognosis, the more they will refer to this work if they have it at hand. We need not say more. *Dundas Grant.*

The Medical Annual. Bristol: Wright & Co., 1915.

At a time when the current literature of the stirring and anxious course of present-day events occupies all our available time for reading or study, we are apt to degenerate into a state of mental stagnation in regard to the other affairs of life. The progress we make from year to year in the knowledge and practice of our technical specialties is apt to be slowed almost to a stationary condition under such circumstances. As an antidote we can recommend nothing more inspiring or reviving than a perusal of the last issue of *The Medical Annual* in reference not only to our particular subjects but to the art of healing in general. In accordance with the spirit of the times we may select such an article as that of Mr. Lenthal Cheate on the treatment of wounds received in war. From our own limited point of view, however, there is nowhere to be found a more instructive or skilfully condensed account of the recent advances in laryngology and otology than what is provided for us by Mr. J. S. Fraser, of the Edinburgh Royal Infirmary. He is not merely a zealous student and critic of the works of others, but an original investigator into the fundamental bases of our knowledge, especially in the anatomy and pathology of the organs we are concerned with, especially those of hearing. The less special and more general surgical aspects are illustrated by such chapters as Mr. Monsarrat's on the major surgery of the œsophagus, cancer in the neck, etc. Tuberculosis, asthma, and other diseases of the chest are again in the masterly hands of Dr. J. J. Perkins. We can again most cordially recommend the volume to all, but especially to those who feel themselves temporarily becalmed. *Dundas Grant.*

NOTES AND QUERIES.

SIR MILSOM REES.

Among the Knighthoods conferred on the occasion of the New Year we are interested to observe the name of Mr. Milsom Rees, Laryngologist to the Royal Households.

BI-CENTENARY OF THE FIRM OF ALLEN AND HANBURYS.

It is with great pleasure that we observe that the above firm have just celebrated the 200th anniversary of their foundation as chemists and druggists in London. We heartily congratulate them upon their long life and continuing progress and prosperity. And in these days, when the world is suffering from one of its recurrent convulsions of change, the best we can hope for is that they and all other well-established British institutions may maintain their stability steadfast, with their evolution proceeding along an even and peaceful course.

BOOK RECEIVED.

Diseases of the Throat, Nose, and Ear. By *William H. Kelson, M.D., B.S., F.R.C.S.(Eng.)*. London: Henry Frowde, and Hodder & Stoughton. 1915.

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SKIN-GRAFTING IN MASTOID OPERATIONS.¹

BY H. J. MARRIAGE, F.R.C.S.

MR. PRESIDENT AND GENTLEMEN,—In the first place, I wish to express my thanks to our Council for the honour they have done me in asking me to open this discussion, and I much regret that, owing to the large amount of time which we are all spending in the treatment of the wounded, I have been unable to refer to the literature of the subject as much as I could wish. I therefore propose to deal chiefly with my own personal experiences, in the hope that other members will speak of their methods and results, so that we can form some definite opinion as to whether skin-grafting is the best form of treatment in these difficult mastoid operations.

In the first place, as regards cases of acute mastoiditis, where the antrum and mastoid cells are opened up without any interference with the tympanum, I think it is quite evident that skin-grafting is not advisable, as the object aimed at is to get free drainage and to allow the cavity formed to fill up as much as possible with granulation tissue and new bone.

The cases for which skin-grafting is, in my opinion, most advantageous are those of chronic mastoid disease, and I propose to devote most of the time allotted to me in discussing the treatment of these cases by skin-grafting, both primary and secondary. As far as I can trace, skin-grafting in the radical mastoid operation was first brought forward by Siebenmann in an article in the

¹ Opening paper read at the Otological Section of the Royal Society of Medicine. See p. 92 of the present issue.

Berliner klinische Wochenschrift in 1893,¹ who suggested applying a graft some two or three weeks after the primary operation. In 1897 Denker advised in certain cases the application of Thiersch grafts two to four weeks after the primary operation, and in 1903 I saw Jansen applying small grafts with intervals between each piece of skin at the time of the original operation, and I believe he had been doing this for a year or more. I think, however, that the chief credit for this form of treatment belongs to Mr. Charles Ballance, who brought the subject prominently before our profession in the very instructive paper which he read before the Royal Medical and Chirurgical Society on January 23, 1900.² In this paper he recommended the application of one or more large Thiersch grafts to the cavity about a week or ten days after the performance of the radical operation. Since that time many suggestions have been made as to how and when the graft should be applied, and I will now shortly mention some of the different methods.

Ballance's original method was to cut a large Thiersch graft 3 in. by 2 in. from the inner part of the thigh, and, by means of a large section lifter similar to that used in the making of microscopic slides, to transfer this to the mastoid cavity; by the use of a glass pipette the graft was then sucked into position so as to line accurately the whole cavity, a second smaller graft was applied to the soft parts behind the ear, and one end brought through the meatus, this graft being made to cover the raw surface of the posterior meatal wall from which the concho-meatal flap had been cut. Gold leaf, or some other form of protective, was then applied to the surface of the graft, and small sponges with a strip of gauze next inserted to keep the graft in position. As a modification of this method, Milligan proposed "to fill the mastoid cavity with normal salt solution, floating the graft upon the fluid and then sucking up the fluid *per meatum* with a large pipette. As the fluid is withdrawn the graft sinks into the cavity, and ultimately comes to lie in accurate apposition with its granulating walls."³ Another method is to use, instead of a lifter, a piece of crêpe tissue, upon which the graft, with its cut surface facing upwards, is carefully spread. The crêpe is then gathered up and, with the graft still clinging to it, is inserted into the operation cavity by way of the auditory meatus and, with the aid of a probe, spread over its walls.

¹ *Berl. klin. Wochenschr.*, 1893, xxx, pp. 44, 45.

² *Med.-Chir. Trans.*, 1900, lxxxiii, pp. 125-165 (Discussion, p. 173).

³ "Diseases of the Ear," by Milligan and Wingrave, p. 338.

In 1903 I saw Politzer employ the following method so as to avoid reopening the post-aural wound. He made use of a glass tube with a bulb at the end of it, in which were several small holes; a small graft, which was cut under local anæsthesia, was placed over the end of the bulb with the epidermal surface against the glass, and after the bulb had been introduced into the ear through the meatus the graft was blown into position. Several small grafts were employed, and the cavity then plugged. A similar method has also been advocated by Dr. Stoddart Barr.

I now wish to say a few words with regard to the cutting of the skin-grafts. This, I believe, has caused some surgeons a good deal of trouble, and is probably one of the reasons why, at times, good results have not been obtained, as the grafts cut have been much too thick. The method I employ is to place the thigh in the abducted and everted position, and to put a small sandbag under the lower end of it so as to get a flat surface. My assistant then places the ulnar surface of his hand about 3 in. above the knee and draws the skin downwards towards the knee as much as possible. With my left hand I make counter traction towards the hip, so as to get the skin fully stretched, and then, with a hollow-ground razor which is about half as large again as the ordinary shaving razor, I cut a thin graft about 3 in. long and 2 in. wide, always cutting towards the knee. Various methods have been suggested with the idea of making this part of the operation easier; for example, Waggett recommended painting the skin with "newskin": Wyatt Wingrave with a solution of celloidin in acetone (10 per cent.), and Deansley advised applying sticking-plaster to the thigh before cutting the graft, and I believe from America came the suggestion that a piece of board should be used instead of the assistant's hand to keep the skin on the stretch so as to get a more level surface; but I think none of these aids is really necessary after a very little practice.

Having mentioned the methods of cutting and applying the graft, I now wish to discuss the advantages and disadvantages of skin-grafting. The advantages, in my opinion, are:

(1) The cavity heals much more quickly than by other methods.

(2) Contraction of the cavity and stenosis are prevented, and at the same time there is no possibility of granulations extending across various parts of the cavity, and so shutting off cavities which remain unhealed and cause persistent discharge.

(3) The patient is spared a large amount of pain which

formerly was caused by firmly plugging the raw surface of the mastoid cavity.

(4) Both the patient and surgeon are saved much time and trouble, as about ten days after the grafting operation the patient is able to do nearly all that is necessary for himself and only see his surgeon once a week; and the patient is thus able to return to work much earlier than when he was obliged to attend daily for treatment.

(5) The surgeon is not worried by having to make complicated meatal flaps, many of which cause much deformity of the concha, and when made are often difficult to keep in position, as all that is necessary is to remove sufficient of the posterior meatal wall to ensure easy access to the antrum and mastoid cavity.

The method I usually employ is to make an incision at the junction of the posterior meatal wall and the concha, and a second incision along the middle of the floor of the meatus, and, after cutting away some of the subcutaneous tissues, to suture with cat-gut the flap so formed to the soft parts immediately behind the ear, so that the skin surface of the flap looks toward the mastoid cavity.

(6) In a large proportion of cases the Eustachian tube is closed, and reinfection *viâ* the tube is thus prevented.

As regards the objections to skin-grafting, it has been pointed out that it is impossible to get the cavity aseptic, but in practice it has been found that this makes no difference, and that in ninety-nine out of every hundred cases the graft takes perfectly well, and that even in the exceptional cases when the grafting is not a complete success, islets of cells are left behind from which the skin quickly grows over the cavity. At the same time I should like to point out that in performing the radical mastoid operation it is essential thoroughly to open up all depressions in the bone, so as to make sure that septic cavities are not left behind the graft; it is also necessary that the graft should be extremely thin.

With regard to the hearing, Ballance in his original paper stated that he found the result much the same as after the older method of dry gauze tamponning, and in a later note added that the result was better than in the older method, attributing this to the very thin layer of tissue which formed over the fenestra ovalis. In a paper published in the *Lancet* on August 17, 1912, Ballance also states that 75 per cent. of a number of private cases tested showed remarkably good hearing as the result of the operation. Grafting certainly has one small disadvantage, and that is that the cavity is very liable to become filled with a collection of cerumen and epithelium which, if left, may cause ulceration of the skin surface;

but the collection is easily removed, and, if done regularly once or twice a year, no harm results.

I next wish to consider the question of primary skin-grafting, *i. e.* the application of a graft at the time of the original mastoid operation. I first tried this method in March, 1908, and since then have used it regularly in uncomplicated cases of chronic mastoid disease; but I do not use it in cases of acute mastoid disease, where it is necessary to perform a radical mastoid operation, preferring in these cases to do the skin-grafting at a later date.

The advantages of the primary skin-grafting are, in my opinion :

(1) Seven to ten days are saved in the convalescence of the patient.

(2) It does away with the necessity of a second anæsthetic, which many patients so much dread, and I think that having two anæsthetics so close together did affect the patient's general health, especially in the case of those who were very nervous.

The method I employ is as follows: I first perform the ordinary radical mastoid operation, taking care to remove as far as possible every trace of disease, and exposing the dura of the middle fossa and the lateral sinus if I am not quite satisfied with the appearance of the bone lying in contact with these. After cutting a meatal flap I then scrape out the tympanum, removing the whole of the mucous membrane except a very small margin around the stapes, after which the opening of the Eustachian tube is curetted with a small sharp spoon. In order to disinfect the cavity and check the bleeding, I next pour in hydrogen peroxide (20 vols.) which is left in for two or three minutes, and then syringed out with normal saline at 105° F. This is done three times. The cavity is immediately plugged with gauze, the plug being left in while the graft is cut and only removed when everything is quite ready for applying the graft, which is got into position by means of the suction apparatus recommended by Mr. Ballance, and kept in place by the immediate insertion of a long strip of ribbon gauze, $\frac{1}{2}$ in. in width, on which has been dusted some aristol powder to prevent the discharge from becoming offensive. No protective of any sort is used. The end of the gauze is passed through the meatus, and the free end of the graft which is lining the posterior part of the cavity is folded over the plug and also brought out through the meatus, so as to cover its cut edge. After ligaturing the vessels, which have been caught with artery forceps during the operation, the skin opening is sutured, bringing the ear back into its normal position. The plug is left untouched until the fourth

day after the operation, when it is withdrawn and the cavity syringed out with a weak solution of hydrogen peroxide, a small piece of ribbon gauze being again lightly inserted to soak up the discharge. The same treatment is continued daily for about one week, when all plugging is stopped, and plain hydrogen peroxide (10 vols.) is dropped in twice daily, and the patient seen at intervals of about seven days, so that any small areas which are granulating too freely can be cauterised with silver nitrate or scraped with a sharp spoon. The superficial part of the graft gradually separates, and usually comes away when the ear is syringed, but it may be necessary to remove it with forceps. When the cavity is nearly healed I often prescribe rectified spirit, or equal parts of hydrogen peroxide (20 vols.) and rectified spirit, so as to harden up the skin surface.

In my opinion, primary skin-grafting is to be preferred to blood-clot dressing, as in the latter method, in addition to the risk of the clot becoming infected and breaking down, the granulations formed in some individuals are liable to become too exuberant, and instead of being transformed into a glistening membrane have a tendency to fill the whole cavity with fibrous tissue, causing obstruction of the round and oval windows. In any case I think it is better to have the cavity lined with healthy skin rather than with cicatricial tissue. With regard to scarlet red and similar substances, the chief objections are that constant attention is required and that pockets are liable to form owing to granulations from different parts of the cavity fusing together. This method may perhaps be useful for the healing of granulating areas when the graft has not taken well, but I shall be pleased to hear the opinions of members who have had a large experience of these methods.

When first performing primary grafting in 1908, I kept notes of the first 50 cases, and I have referred to these to see how long each case took to heal, *i.e.* for the cavity to become completely covered with skin and absolutely dry. In these cases the plug put in at the time of the operation was left in for seven days instead of four as now, and though I cannot give exact figures for a series of my later cases, I feel certain that my results now are considerably better than they were in 1908, as I pay more attention to the posterior meatal wall, removing as far as possible any exposed portion of cartilage, because I found that this was responsible for the delay in healing in the majority of cases. Of these 50 cases, 7 were lost sight of after leaving hospital, as 5 returned to the country and were not seen again, and 2 failed to attend for treatment, so I propose to deal with the

remaining 43. Of these, 1 healed in nineteen days, 1 in twenty-one days, 6 in one month, 1 in five weeks, 7 in six weeks, 7 in seven weeks, 5 in two months, 6 in two and half months, 1 in three months, 1 in three and half months, 3 in four months, 1 in four and half months, 2 in five months, and 1 in nine months, so that you will observe that 34 out of the 43 cases were healed in two and half months or under. Of the other 9 cases, caries of the internal wall of the tympanum caused the delay in 4—viz. 1 of three and half months, 1 of four months, 1 of four and half months, and 1 of nine months; caries of the floor of the aditus in 1 of four months, and the posterior cartilaginous meatus in the other 4 cases—viz. 1 of three months, 1 of four months, and 2 of five months, and in one of these (the case which took four months) the delay was partly caused by the patient stopping away for two months soon after leaving hospital.

I should like to mention that in these 50 cases, the dura of the middle fossa was exposed in 25, the lateral sinus in 2, and both the dura of the middle fossa and the lateral sinus in 15, so that in 42 out of the 50 cases there was exposure of some part of the dura. In no case did I have to remove the graft on account of suppuration.

I have also looked into the important question of hearing, though unfortunately only a watch was employed. Of the 43 cases which I was able to follow until they were completely healed, I found that 2 had internal ear deafness before operation, and in 2 more the original hearing was not noted; I can therefore only deal with 39. Of these the hearing improved in 29 (74·3 per cent.), deteriorated in 8 (20·5 per cent.), and remained unaltered in 2 (5·2 per cent.).

The results given by Grunert after the tamponning method, were: improved, 55 per cent.; unaltered, 39 per cent.; diminished, 6 per cent.; and by Stacke, who employed the same method: improved, 36 per cent.; unaltered, 57 per cent.; diminished, 7 per cent.

I must lastly say a few words with regard to the cases of chronic mastoid disease where complications are present. If there is a fistula in the bony wall of the semicircular canal, without damage to the membranous canal, I apply a primary graft, and in the series of cases I have just mentioned there were two cases of bony fistula; one was perfectly healed in six weeks, and the other returned to the country at the end of three weeks, when the cavity was healed except for the posterior cartilaginous meatus, which was still granulating. Both cases were relieved from the giddiness with which they suffered before operation.

In cases of suppuration of the internal ear, I do not apply a graft, as the object of the operation is to obtain free drainage, and I think that the application of a graft is very liable to defeat this object.

NOTES ON THE RADICAL MASTOID OPERATION.¹

By J. S. FRASER, M.B., F.R.C.S.E.

(*From the Ear and Throat Department of the Royal Infirmary, Edinburgh, under the charge of A. LOGAN TURNER, M.D., F.R.C.S.E., F.R.S.E.*)

It has always appeared to the writer that we expect a good deal from Nature when we perform the radical mastoid operation. The Eustachian tube is open and we want it to close. Secondly, the external meatus is separated from the tympanum by the drumhead and external attic wall, and yet after we have removed the remains of the membrane along with the bony ledge we expect them not to reform. Thirdly, the external meatus is separated from the mastoid antrum by the bony posterior meatal wall which we take away, knowing that there is a great tendency to its reproduction. Thus we want to close a tube which often persists in remaining open and from which a mucoid discharge spreads over the inner tympanic wall. We also wish to maintain the patency of two artificial openings which tend to close.

In common with many other otologists the writer begins the radical operation by making a semi-circular incision in the hair margin, curving forward below to the tip of the mastoid (Fig. 1), because when the wound is stitched up at the end of the operation the line of incision lies over the posterior part of the mastoid process, which does not require removal except in cases where a sinus thrombosis or an extradural abscess in the posterior fossa have to be dealt with. The flap thus outlined is dissected forward subcutaneously till the region of the retro-auricular groove is reached, when an incision is made through the periosteum down to the bone. In this way a valvular wound is obtained and the line of incision is not "in the air" as is the case when the cut is made in the retro-auricular groove. In at least nineteen cases out of twenty the wound heals by first intention, without a drop of pus, and in the twentieth there is at most a stitch abscess or two. The writer, however, does not deny that equally good results may be obtained by other methods.

¹ Contribution to Discussion at the Otological Section of the Royal Society of Medicine. See p. 95.

With regard to the gonges employed in the removal of bone, it has always appeared to the writer that—the masonic craft being an exceedingly old one—the nearer the otologist could get to the gonge, or chisel, of the stone-masons the better. The Vienna pattern of gouge seems to be the nearest approach. This instrument has a large, rounded, proximal end which projects from the shank so that the operator can get the end of his left thumb up against the projection and thus prevent the instrument from slipping and injuring the facial nerve or labyrinth, when the



FIG. 1.—Lines of incision for outlining skin graft (left ear). The crescentic piece of skin is left attached to the periosteum, and the flap in front dissected up subcutaneously as far forward as the retro-auricular groove where the incision is made through the periosteum down to the bone.

wooden hammer is forcibly applied. The writer has had one case of facial paralysis in the early days in nearly four hundred mastoid operations. The affection almost entirely passed off within two months.

After the bridge has been removed the facial spur is very freely shaved down with a large gouge, so that the floor of the bony meatus, the spur, and the floor of the mastoid cavity form a very gentle slope (Fig. 2). Stacke's protector is never used, because if one does not feel safe without the aid of this instrument one should not operate at all. In many cases it is also advisable to level down the convexity on the floor of the bony meatus with a medium-sized gouge, so as to give good access to the tympanum for after

treatment. It is needless to say that the external wall of the attic and aditus should also be freely removed.

In the writer's experience the lower end of the long process of the incus is usually absent in cases which come to the radical mastoid operation. As the ossicular chain is thus broken, one cannot see why the radical operation should result in any deterioration of the hearing power. In such cases the *raison d'être* of the modified radical operation is hard to explain. This remains true whether we look upon the chain of ossicles with its two tympanic muscles as

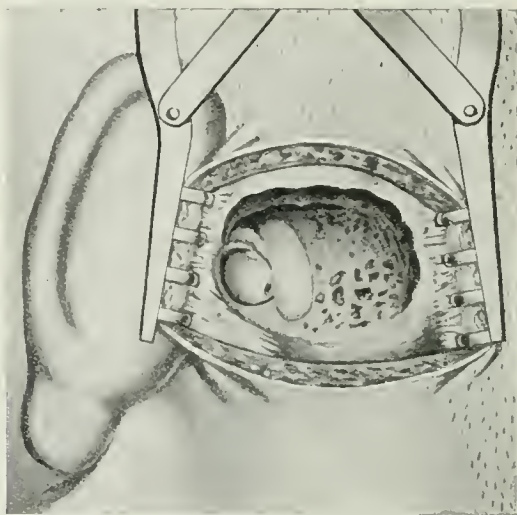


FIG. 2.—After the radical mastoid operation (left ear) has been completed, the crescentic skin graft is cut off, trimmed, and applied over the facial spur, the inner end of the graft reaching the prominence of the external canal.

a sound-conducting apparatus or merely as a mechanism for regulating the intra-labyrinthine tension, or as both combined.

The plastic operation on the membranous external meatus may be performed at almost any period of the operation. The writer uses either Koerner's oblong flap or Neumann's Y flap, and performs the meatal plastic after the removal of the bridge, malleus, and incus, but before the lower part of the tympanic cavity and Eustachian tube are dealt with.

The writer believes that the inner tympanic wall should be left alone as much as possible in order not to interfere with the window niches. If, however, a polypus be present, this is impossible, as in the great majority of cases the inflammatory swelling springs from

the lower and posterior part of the promontory between the windows. In removing such a polypus, or in curetting out with the angled spoon, the remains of the drumhead, it is most important not to scrape away the epidermis covering the anterior and inferior walls of the bony meatus in order to avoid subsequent narrowing of the meatus at the isthmus (Fig. 4). In some cases we have the formation of a complete membrane in this region, with a resulting separation of the more superficial parts of the radical mastoid cavity from the deeper portions, *i. e.* the tympanum and aditus in which suppuration may continue.

The Eustachian tube is a great difficulty. In the writer's experience there is a large class of cases of chronic suppurative otitis media, with oval perforations in the anterior part of the drumhead, or

FIG. 3.

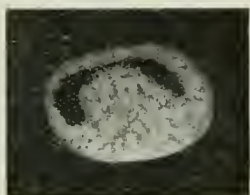


FIG. 4.



FIG. 3.—Appearance of cavity as often seen about three weeks after operation on left ear in cases in which skin graft is not applied. Granulations are seen growing upwards from the lower cut edge of the posterior bony meatal wall (facial spur), and downwards from the cut edges of the external wall of the attic and upper part of the posterior bony meatal wall. One can with difficulty see into the tympanum in front and into the antrum behind.

FIG. 4.—Appearance six to eight weeks after operation in unfavourable case. The outer part of the operation cavity has become lined by squamous epithelium, but a "contraction ring" has formed at the point where formerly the isthmus of the meatus was situated. Through this ring we can see the so-called "granulations" on the inner wall of the tympanum. In some cases the ring closes entirely, so that we have a complete formation of a membrane or partition between the outer and inner portions of the operation cavity. Suppuration may continue behind this membrane, and, if the case be again operated on some months or years later, it is found that a great deal of new bone formation has taken place.

kidney-shaped perforations below the umbo, in which the suppurative process is confined to the anterior or tubal portion of the middle ear cleft and the lower part of the tympanic cavity. The cases are really "tuborrhœas," and in many of them the hearing power is very good. If the surgeon is ill-advised enough to perform the modified radical operation on such cases on account of the good hearing, he is disgusted to find a healthy antrum. If he now goes on to complete the radical operation so as to get good access to the Eustachian tube and tubal portion of the tympanic cavity, he is again likely to be dis-

appointed, because he will find a large tube which is exceedingly difficult to close, even with the aid of Alexander's rectangular curettes, which are accurately made to fit the outline of the bony tube (see JOURNAL OF LARYNGOL., RHINOL., AND OTOL., December, 1915, p. 460, Fig. 3). It is hard to credit the claims put forward by Yaukauer and other American otologists with regard to the results they obtain from curetting the Eustachian tube through the normal external auditory meatus (*Laryngoscope*, 1915, p. 675). Yankauer uses a small, circular curette, and advises local anæsthesia. He has collected 735 cases, operated on by various otologists. Of these, the tube was successfully closed after one or more curetings in 609 (83 per cent.), while 379 patients were reported as cured (51.5 per cent.). The writer finds it difficult to understand how surgeons, who only have the aid of local anæsthesia, who use an inefficient instrument, and operate round a corner by feel or guess-work, can obtain results which are not much worse than those following the curettage of the tube under general anæsthesia, with an efficient instrument, and guided by direct vision. Longee (*Jour. Amer. Med. Assoc.*, 1914, p. 1576) says the curettage of the Eustachian tube through the external meatus is of very little value. He reports twenty-one cases, and in only two instances did he obtain closure of the tube.

From what has been already said it will be seen that, in the writer's opinion, the modified radical operation is not advisable in cases of chronic middle ear suppuration (usually with a marginal perforation in the posterior superior quadrant) in which the continuity of the ossicular chain is broken by the loss of the lower end of the long process of the incus, nor in cases with anterior or central perforations associated with "tuborrhœa." In fact, the only class of case in which the modified radical operation appears to be of advantage is a comparatively small one—viz., cases of "attic" perforation with good hearing. We must, however, remember that cholesteatoma is present in most cases of attic perforation. In the writer's opinion this does not negative the modified radical operation.

In operating on cases complicated by cholesteatoma the writer does not as a rule remove the matrix, because if this be left *in situ* it greatly assists the rapid epidermising of the cavity. Cholesteatoma consists of squamous epithelium, and this is exactly what we hope the mastoid cavity will eventually be lined with. Perhaps a little extra care may be needed in the after-treatment of these cases, *e. g.* drops of salicylic acid in alcohol and more frequent syringing than usual. It is absolutely necessary to impress on all patients on whom the radical operation has been performed that they must

have their "operated" ear attended to at least once a fortnight, and better still once a week for the rest of their lives.

In order to obtain a dry cavity the writer believes that it is very important to make a large external auditory meatus by extending the incisions for the plastic well into the concha and stitching back the flap. When the whole cavity has become thoroughly healed and the skin lining it has become pale, the increase in size of the external meatus is hardly noticeable. If the meatus be too small, the cavity tends to remain moist. This may not be a disadvantage as far as hearing is concerned, but both surgeons and patients prefer a dry ear.

The writer has found that there is not infrequently a tendency to drooping of the auricle after the radical mastoid operation, *i. e.* the auricle on the operated side is at a lower level than on

FIG. 5.



FIG. 6.



FIG. 5.—Appearance three weeks after operation (left ear) in case in which skin graft was applied to facial spur at time of operation. The epithelium is seen spreading over the granulations.

FIG. 6.—The result one hopes to, *but does not always*, see after the radical operation on the left ear. The tube is closed, and the operation cavity has healed with retention of the outline of the inner wall. The promontory, oval and round window niches, facial canal, attic, prominence of the external semi-circular canal and antrum are all clearly seen. (The patient can hear a whisper at six feet with the left ear.)

the non-operated side. This is not only unsightly, but also tends to narrow the external meatus. In some cases the drooping is so marked that in order to inspect the cavity the surgeon must almost go down on his knees, or must tilt the patient's head over towards the opposite shoulder to an uncomfortable extent. To obviate this the writer has for some time removed a crescentic piece of skin at the upper and posterior part of the curved retro-auricular incision. The area removed is about 1 inch long and $\frac{1}{4}$ of an inch wide at its broadest part. For a time this small piece of skin was thrown away, but of late it occurred to the writer that the skin might be used as a graft to cover the facial spur, and so obviate the tendency to the reformation of the posterior bony wall of the external meatus. No matter how freely this wall has been removed

above, so as to lay open the attic and aditus, and no matter how well the spur has been smoothed off below to expose the promontory and window niches, within two or three weeks after the radical operation there is, in certain cases, an exuberant growth of granulations from above and from below in the region of the cut edges of the posterior bony meatal wall (Fig. 3). Like stalactites and stalagmites, these tend to meet. This exuberant growth is especially seen in cases in which the bone is found to be very vascular at operation, and in obstinate instances no method of after treatment seems to make much difference—packing or non-packing, spirit drops or dry boric insufflations, scarlet red or liquid paraffin. Only skin-grafting is of service, but to cut and apply a skin-graft from the inner side of the thigh takes up a considerable amount of time. After trying Ballance's method of skin-grafting with reopening of the retro-auricular wound ten to fourteen days after the radical operation, the writer came to the conclusion that it was not worth while. In other cases, in which the graft was applied through the enlarged external meatus, it seldom "took." The writer has no practical experience of the application of large thin Thiersch grafts to the bony surface at the end of the operation, but a theoretical objection appears to be that the mucosa of the tympanum cannot be entirely removed, even by the most thorough curetting, *e. g.* in the region of the window niches, in the irregularities of the tympanic floor, in the sinus tympani, etc. It seems impossible that a skin-graft can "take" over these areas. On the other hand, grafts consisting of the whole thickness of the skin (dermis and epidermis) "take" well when applied to the raw bony surface of the facial spur and floor of the bony meatus, according to the following method: The crescentic piece of skin is outlined with the knife at the time of the original incision (Fig. 1), and, during the operation, is left attached to the periosteum covering the mastoid. When the operation is completed the cavity is syringed out with lukewarm saline lotion and temporarily packed with sterile gauze. The crescentic portion of skin is now excised with the knife or scissors, and placed on the sterile towel covering the patient's head, so that the epidermic surface is next to the towel and the fatty subcutaneous surface upwards. The assistant now seizes one end of the graft with a pair of mouse-toothed forceps, while the operator does the same at the other end. In this way the graft is stretched between the two pairs of forceps. The subcutaneous fatty tissue is now picked up by the assistant with the aid of a third pair of forceps, while, with scissors curved on the flat, the surgeon dissects away the fatty tissue, leaving only the cutis vera and

epidermis. The gauze is now removed from the mastoid wound and the skin-graft is applied to the cut surface of the facial spur, and covered with an oblong piece of perforated oiled silk only slightly bigger than the graft itself. If a larger crescentic piece be excised, it may be divided transversely, one portion being applied to the floor of the bony meatus which has been lowered with the gouge while the other piece is applied to the facial spur as described. The skin-grafts covered by the oiled silk are then held in position by the assistant, with the aid of a pair of angled forceps, while the surgeon packs the tympanic cavity, aditus and antrum, with iodoform worsted, which retains the graft in position after the assistant has withdrawn his forceps. The retro-auricular wound and the operation cavity are only dressed on the fifth day. Even when the iodoform worsted is removed, the oiled silk remains in position and has to be taken out with angled forceps. The skin-graft invariably retains its position, and by the end of a period of ten days it is seen to be spreading out towards the antrum and also covering the floor of the meatus (Fig. 5). In one or two recent cases healing of the cavity has been complete in six weeks. The whole procedure only adds at most five minutes to the time occupied by the radical operation.

In itself the "*after-treatment of the radical mastoid operation*" might well form a subject for discussion. As stated above, the cavity is dressed on the fifth day and repacked. The case is again dressed on the seventh day, and daily thereafter up to the tenth. If by this time all looks well packing is omitted during the daytime, but at night, though the cavity itself is not packed, a piece of gauze is inserted into the meatus to maintain its patency and also to prevent soiling of the pillow. It must, however, be confessed that there are cases in which the "non-packing" method has to be abandoned in favour of "packing." In these cases the after-treatment is long and tedious, both to surgeon and to patient. If the latter lives in town and can attend daily at the hospital, he may be able to resume work, and, in any case, does not require to have a bed in the ward. It is different, however, in the case of country patients, whose after-treatment cannot well be left to the care of the busy practitioner or district nurse. Except for the daily treatment of the ear, these patients do not require skilled attention or nursing, and it has often struck the writer that a hospital bed was wasted in such cases. Some less elaborate form of accommodation would serve the purpose equally well. In this way hospital beds would be more quickly available for fresh operation cases, and long "waiting lists" would be largely obviated.

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE—OTOLOGICAL SECTION.

November 19, 1915.

President: DR. ALBERT A. GRAY.

Bony Sequestrum, believed to be the Annulus Tympanicus, removed from the External Meatus of an Infant.—H. L. Whale.—The child, aged two years and nine months, had suffered continuously from otorrhœa since the age of fourteen months. The specimen exhibited broke this afternoon, so members cannot now see what it looked like. I do not know whether it is an annulus; I showed it to Dr. Dundas Grant, and he agreed that was what it appeared to be.

Otomycosis; Colony and Microscopic Slide of *Aspergillus fumigatus*.—H. L. Whale.—The fungus was growing profusely on cerumen on the floor of a radical mastoid cavity in a male, aged twenty-five. The cavity was entirely epithelialised and dry, not eczematous. The patient complained of slight itching. The mass looked like frost-covered grass, white, with an obvious glint of green in patches. The patient had not been living in a hot climate or unhealthy surroundings, nor had he been putting oil into his ear, nor been in contact with pigeons or other birds.

The PRESIDENT: Otomycosis sometimes presents a very curious colour. I saw one case of a brilliant emerald green. There was evidently some change in the colour of the fungus, probably due to the absorption and transformation of some pigment from the wax. (In reply to a question asked by Mr. West): I should call this otomycosis. I do not know that the term has been exactly defined; perhaps members will give their definitions.

Dr. GRANT: In old days, when oil was much used in treating ear conditions, otomycosis was said to be much more frequent than now. At that time probably the aspergillus grew in the oil rather than in the tissues. In the present case the cerumen may act as the base in the same way. I do not think the fact of the growth taking place on cerumen is an objection to the application of the term "otomycosis."

Prof. URBAN PRITCHARD: I have always been much interested in the subject of aspergillus. I do not believe the application of oil to the ear had any part in the causation. I was on the look-out for the condition—some twenty-five years ago—for six years before I saw a case, so that it would not seem to have been very common then. It is less common in England than anywhere else in the world. It is common in Switzerland and Austria, and it is the commonest ear condition noticed by doctors in Bombay. I think its incidence is more to do with locality. I have half a dozen specimens of the *niger* variety from my own patients, but fewer of the *fumigatus*. I think the only differentiation between

fumigatus and *flavus* is derived by growing a culture. I had a specimen of *flavus* sent me from New York, and that was yellow under the microscope. Mr. Whale's culture specimen shows the *fumigatus* colour beautifully.

Mr. WHALE (in reply): In answer to Mr. West's question, I might call it a case of fungus growing in the ear; it did not grow on the surface epithelium itself. This specimen is *Aspergillus fumigatus*, whereas the ordinary one is *Aspergillus niger*, which is met with chiefly in India, where I was for a time. The *fumigatus* is supposed to be specially met with in people who are brought into contact with birds a good deal, especially pigeons; that was stated by the botanist who helped the pathologist to prepare this specimen. I showed the case because of it being the rarer form. This was certainly acquired in England. The only three varieties I could find mentioned in the books are: *niger*, *fumigatus*, and *malignus*.

Keratosis of the Auditory Meatus.—W. Stuart-Low.—A girl, aged eight, who has had a discharge from the left ear for over a year. Two months ago white spots began to appear at the lowest and outermost part of the meatus; these gradually coalesced and spread round the passage, forming a tough white ring. Dr. Wyatt Wingrave has examined specimens under the microscope, and describes it as an irritative keratosis similar to what is not uncommonly met with on the tonsils, and said to be due to the presence of a lepto-thrix. He thinks any true parasitic growth can be completely excluded in this case. Suggestions as regards treatment are requested.

Remarks by Dr. Wyatt Wingrave: A Portion of Thickened Epidermis from the External Auditory Meatus.—The tissue consists of closely-applied hypertrophied papillæ, whose superficial squames show two changes—vacuolation and keratinoid granular deposit. The dermal papillæ do not appear to have undergone any change. Between the laminae of the squames many mycelial threads are seen, but no spores. It may therefore be a mycosis associated with keratosis. Mycelial filaments may be derived from dirty water used as an injection or may be air-borne. Still, it must not be forgotten that they closely resemble the micro-organisms of a ringworm. Mycelium alone is, however, strongly in favour of a saprophytic nature. There is no evidence of acute inflammation.

Mr. CLAYTON FOX: I think this is a papillomatous condition and that the mycelium is only associated with it, not causally. Such a papillomatous condition is rare. It bears no resemblance to keratosis obdurations. It is probably the result of irritation from long-standing suppuration of the ear. I suggest the use of salicylic acid in paroline, which will act as a solvent for the epidermis and also protect the part from the irritating discharge.

Dr. DUNDAS GRANT: This is an extremely rare kind of case, and seems to be a diffuse warty condition. It differs from the classical keratosis obdurations which Wreden described many years ago. I shall be glad to hear whether members have seen anything like it before. I think repeated application of a spirituous solution of salicylic acid would do good.

The PRESIDENT: Sometimes one sees benefit from mechanical measures, such as gauze packing; salicylic ointment can be applied in the gauze packing.

Mr. STUART-LOW (in reply): I thank you for the remarks about

treatment, as I was at a loss what to do for the case, though I was inclined to try salicylic acid, if I knew the best strength. When I removed a piece for examination it bled profusely, which would perhaps be an indication against scraping, as some members have suggested.

Fractured Skull with Healed Attic Suppuration of an Unusual Type.—**E. D. Davis.**—The patient, an engineer, aged forty-two, complained of deafness after a crushing injury to the head, in which the vertex of the skull was fractured, and an operation for depressed fracture was performed by Mr. Rowntree on April 24. At the time of the accident there was hæmorrhage from both ears. The left ear shows extensive and healed attic suppuration, revealing a cavity of considerable size above and behind the tympanum. Both external auditory meatuses are unusually large in the region of the drum. The deafness is of the middle-ear type, and there is no history of the deafness or of ear-disease previous to the accident.

Mr. O'MALLEY: I have not seen the case, but it seems from the description to correspond closely with one which I recently had under my care at Woolwich. The patient was in the motor cycling corps and started out on duty one night and had an accident. He recollected nothing of it until he recovered consciousness forty-eight hours afterwards. On arriving at Woolwich he was complaining of deafness; he also had eye troubles. His fourth, sixth, and seventh nerves were damaged, and on examining his ear I noticed a large fissure in the upper part of the tympanic membrane extending into the roof of the tympanum. X-ray examination suggested that there was a fracture in this region.

Total Occlusion of the External Auditory Meatus.—**L. A. Lawrence.**—This condition was noticed in a woman, aged thirty-one, who was sent to hospital on account of pain attributed to the right ear, but in all probability due to a carious tooth in the right lower jaw. The right meatus is occluded by a smooth partition stretching completely across the meatus about a third of the depth from the surface. Careful examination failed to show any opening whatever. There was no moisture nor discharge on the surface. No other deformity was found. The Eustachian tubes are both patent. *Râles* were heard through a passed Eustachian catheter on both sides. The left ear is normal. The patient hears an acoumeter 2 in. from the right ear. Weber's test indeterminate. Rinne's test: Right ear —, left ear +. Schwabach neutral. Tuning-forks: R. $\frac{20}{55}$, L. 16. Monochord, R. $\frac{17}{42}$, L. $\frac{17}{18}$, with noise apparatus. The condition is evidently congenital, and the case is shown on account of the rarity of the condition.

Dr. KELSON: In 1904 I showed a case before the Otological Society very much like this in appearance. There the membrane was cicatricial, following suppuration. It is somewhat difficult to exclude that in this case. There may have been some trouble in childhood which has been forgotten. I would like to know what is the differential diagnosis between a congenital condition and one following suppuration. Possibly this may be post-suppurative.

Dr. DUNDAS GRANT: In this case there is absence of a history of suppuration. I had a case not long ago which was almost identical with it, and it was one in which pure carbolic acid had been put in by mistake for carbolised glycerine, and the resulting erosion led to occlusion. The hearing was, however, so much improved by the use of the

Eustachian catheter that there seemed to be no justification for cutting through the diaphragm as one would otherwise have been inclined to do, and I think the middle ear behind it was sound. As a rule in congenital cases there is some concomitant defect of development in the auricle or face, or the Eustachian tube. In the present case everything except the diaphragm seems perfect, and I think there must have been some traumatic cause for the condition early in childhood. My idea of treatment would be to make a small opening in the thinnest part of it and insert a fine tangled tent, small at first and then gradually increased. I think that is more likely to cause dilatation than cutting it into quadrants and stitching up the small triangular portions as is so beautifully described in some of the old text-books. May I ask for an explanation of the numerical nomenclature used in the notes of the case in regard to the monochord?

Dr. DAN MCKENZIE: Last year I showed a case very closely resembling this. There was a definite history of suppuration in the ear during childhood. Probably the present case is not congenital, but is produced as the result of ulceration of the external meatus or by traumatic means. The congenital conditions with which we are familiar do not resemble the appearance here.

Dr. H. J. BANKS DAVIS: I thought it was so hard that it might be solid bone. I think a skiagram should be taken of it to see whether there is any meatus behind it.

Mr. CLAYTON FOX: There seems to be a ring of solid bone round the periphery, 1 or 2 mm. in width. I think it is likely to be a congenital case because it is so definite and symmetrical.

Mr. SYDNEY SCOTT (replying for Mr. Lawrence): I think the atresia may be due to adhesions in early post-natal life. The obstructing tissue is not of bony hardness—it can be easily indented with the probe. The tuning-fork tests are carried out with Bezold's fork and the steel monochord. The former figures represent the lowest audible vibration frequency at maximum amplitude; the latter figures represent centimetres and indicate the length of wire used to produce the highest tone audible by air and by bone conduction, the lower of the two figures refers to bone conduction. I think Mr. Lawrence will agree with Dr. Kelson's suppositions.

Cartilaginous Overgrowth after the Radical Mastoid Operation.
—W. M. Mollison.—H. C—, aged fifteen, has suffered from chronic otorrhoea for years, and has had several operations. Two years ago a radical mastoid operation was performed on the left ear. A few months later a cartilaginous nodule appeared at the concho-meatal junction, and has grown to its present size slowly. Suppuration has continued in spite of operation, and now the mass of cartilage is obstructing the meatus.¹

Audible Tinnitus.—W. M. Mollison.—Patient, a boy, aged nine, complained a few days ago of a "ticking" in his ears; his mother noted that she could hear the noise herself. There is an easily audible ticking in the left ear, very clearly heard through an otoscope; it is not synchronous with the pulse, and is much less audible when the boy's mouth is open; a similar noise is to be heard in the right ear, but much less loud. The boy has retracted membranes, and large tonsils and adenoids. The noise is presumably due to irregular contractions of the tensor tympani.¹

¹ Discussion on these cases was postponed to the next meeting of the Section.

Transparencies of Microscopical Sections through the Temporal Bone, from a Case of Otosclerosis.—A. A. Gray.—Four photographic negatives illustrating bony changes in otosclerosis.

Discussion on Skin-grafting in Mastoid Operations.

The PRESIDENT: We are very much obliged to Mr. Marriage¹ for the clear way in which he has put this matter before us. Historically, I was interested to hear him mention Siebenmann as being the first to employ these grafts, because I saw those cases when I was studying under Bezold at Munich. With regard to Mr. Marriage's remarks concerning secondary grafting, I tried that method a few times, but I never used it much. I gave it up long before primary grafting was introduced, as I was disappointed. Moreover, I found that patients disliked a second operation, requiring a second anæsthetic. Of primary grafting I have not had experience, but I have used a method of my own, which, however, has not yet been published. The method is as follows: Immediately after the mastoid operation, I scrape a considerable area of skin on the forearm after having made the area aseptic (but not with iodine), and I spread the pulpy mass, consisting of epithelial cells and blood, on to little sponges or, preferably, on to gutta-percha tissue, as one would spread butter on to bread. They are then pressed down on to the bony surface, the sponges or gutta-percha tissue being removed at the first dressing. At the end of the first week or fortnight one would think there was no difference in the wound compared with an ungrafted one, but after that period epidermis rapidly begins to appear in the form of islands which coalesce, and the whole bony surface is soon covered. With regard to exposure of the dura mater, I always do that purposely, because I expect it to be a more likely site for the grafted material to live upon. With regard to removing the packing on the fourth day after operation, that was the day which I also hit upon quite independently. At first I only allowed two days, and gradually worked up to the fourth, whilst Mr. Marriage worked the other way from a larger number of days. I find the use of scarlet red helps considerably, and it is probably more useful in my method than it is likely to be in Mr. Marriage's; in mine it helps the cells to radiate from the little islets which are formed. I first used scarlet red as an ointment; now I employ it as a powder mixed with boracic acid, in the proportion of 1 to 8. I generally scrape from the forearm with a long amputation knife; what I implant is a mixture of blood and epithelial cells, and looks like soft, pink paste. In my early cases, I not only grafted at the time of the operation, but at subsequent dressings also.

Mr. C. E. WEST: The points of interest seem to be, firstly, those concerning technique; and secondly, the *pros* and *cons*. With regard to technique, it is best for each person to say what he does. To take the graft, I use any razor which is sharp; if I have any doubt about it I shave myself with it on the morning of the operation: it is no good to trust to the instrument-maker to sharpen it. The Thiersch knife I consider a badly balanced and unsatisfactory implement. The next essential is to have a light hand. I do as thorough an operation as I know; I remove the posterior bony meatal wall as low as I dare. I do not make a point of exposing the dura mater, but I do not mind whether it is exposed or not. I clean the cavity out as far as I can by packing

¹ See p. 73.

it with dry gauze, and I tampon it with gauze wrung out in 1 in 1000 adrenalin. Then I cut the graft. I take it up with two fingers, and spread it out until it lies in contact with the wall of the cavity; then I tampon it into place with gauze wrung out in paroleinè and bismuth subnitrate, which prevents putrefactive organisms multiplying, while the paroleine greatly aids the ease of extraction of the plug afterwards. I bring the ends out through the meatus, I form a flap, which I think is Ballance's original flap. It is most important to have an adequate opening; and if you keep a long, firm, even curve in the incision, there is nothing lacking in æsthetic effect. It is necessary to pare the flap as thin as possible. It is a marvel to me how primary grafts take on a new raw bony surface. What I find most difficult is to get sufficiently close apposition between the graft and the relatively soft tissue of the deeper surface of the concha; it is there that I get most persistent granulations. With regard to the contra-indications, I agree with Mr. Marriage that one would not graft a confessedly infected labyrinth; and I will go much further. I used to think it was safe to graft a case of canal fistula in which I had good reason to suppose that the periosteum of the canal was intact; but I lost two cases from meningitis owing to doing that, and I have not done it since. And I do not now graft a case which has had undoubted symptoms of vertigo, whether inspection revealed a labyrinth lesion or not. With reference to the *pros* and *cons*, in a routine case of chronic disease which will not get well without operation, I think one saves time, on the whole, by primary grafting, and in fewer cases are there troubles afterwards when this is done. I do not think the results brought forward are more than impressions, but I think one gets better hearing after grafting, as a rule, than without grafting. I think it is because in a proportion of the latter cases there is a filling up of the tympanum. We shall not form conclusions on this until we have an elaborate series of cases in which operation has been carried out under the same conditions, and there is a complete record of the hearing power before and after operation. I do not think it suffices to group cases as "improved" and "not improved." I think that if you do the radical mastoid operation on a patient whose hearing was good before the operation, you will nearly always find his hearing is reduced afterwards. On the average, I think the hearing is not much altered either way. If you operate upon a patient who had pure middle-ear deafness, there is a chance of improved hearing after the performance of the mastoid operation. If there is not much cicatricial tissue in the tympanum, I do not think it matters much whether you have grafted or not. I should like to hear the views of other members, particularly with regard to the dangers of skin-grafting in cases of possible infection of the labyrinth, a matter which impresses me more than anything else in regard to primary skin-graftings.

MR. SYDNEY SCOTT: Mr. Marriage's paper is a very interesting one, and impresses upon me the similarity of our experiences and views. I prefer, however, to transfer the graft by moulding it over gauze and packing it directly into the cavity, and have discontinued the use of paroleine, mentioned by Mr. West, because of the possibility of a thin film intervening between the graft and bone and preventing intimate contact. Age presents no contra-indication, and when it is impossible to obtain a graft from a wasted infant the graft is taken from a more robust subject. Special treatment is necessary after skin-grafting on account of the formation of casts of epithelium which accumulate in the cavity afterwards. Will the President say whether this occurs after his method of

grafting? [The PRESIDENT: Yes, it does; but I find that time puts it right.] Patients should attend regularly every three months, *whether they feel any complaint or not*, after the radical mastoid and skin-grafting operation, for the purpose of removing this epithelial accumulation, otherwise ulceration is apt to occur beneath. After a year or so the epithelial accumulations are much less troublesome. Like Mr. Marriage, I do not hesitate to apply a graft over a fistula of the external semi-circular canal when the labyrinth is properly functioning, and I have never seen bad results from doing so. Where it is intended to drain the labyrinth for suppuration in it, I do not graft over the labyrinth, nor after opening the internal auditory meatus, as in the translabyrinthine operation; in these cases I confine the graft to the mastoid area. Favourable results can be obtained even when an extra-dural abscess has been opened by grafting after completing the radical mastoid operation, but naturally one cannot employ the same technique in every case. The President's method of grafting seems so simple that I intend to try it upon the next opportunity.

Mr. MARK HOVELL: Most of my cases have been treated by grafting, and therefore I cannot draw a comparison from experience between cases which have and those which have not been grafted. I think success greatly depends on the thinness of the graft. With regard to flattening the surface from which the graft is to be taken, I think the application of a paper-knife or some other straight edge draws the skin tighter and flatter than using the hand. With regard to accumulations of cerumen and skin, I agree that, as time goes on, the quantity lessens; they are universally present, and it is important that they should be removed.¹

Mr. HUNTER TOD: After the excellent paper of Mr. Marriage, which has been so heartily supported by others, it is difficult to say anything against skin-grafting. And yet I would compare the two methods, grafting and non-grafting, for this reason—that I am one of those who in recent years have not made a practice of grafting. Much depends on the character of the case. Probably those who have taken up grafting as a routine measure started with successes, because they did it first in simple cases. My experience has been among cases nearly all of which suffered from complications. At the London Hospital 10 per cent of the mastoid operations have accompanying intracranial complications, and most of the patients are ill-nourished, and are not brought to the hospital until they have extensive bone disease. I did not get good results from grafting in my early cases, partly owing to the class of case operated on, and partly, perhaps, owing to faulty technique on my part; therefore I largely gave it up. In the straightforward complete mastoid operation, without grafting, for chronic otorrhœa, for polypi and middle-ear disease without extensive bone disease, the average duration of time before healing takes place is two to three months; one expects the stitches to be removed within one week, and the patient to be out and about within three weeks. Mr. Marriage, I admit, has had quicker results, and I congratulate him on having 99 per cent. of his grafts take successfully. My experience is that in a certain proportion of cases—certainly larger than Mr. Marriage mentioned—granulations spring up about three weeks after operation from points of underlying diseased bone which one thought had been removed. Another group of cases is those in which there is general bone disease—mastoid osteomyelitis; these are very difficult to cure, either with or without a graft. One of my chief difficulties after the complete mastoid operation has been that instead of skin growing in, you get

¹ See p. 120.

mucous membrane growing out from a patent Eustachian tube, sometimes spreading over the inner surface of the tympanic cavity and antrum. In such cases the patient may have good hearing, but there is still a mucous secretion. I ask whether Mr. Marriage finds this also, and whether he thinks that putting in a graft prevents this infection of the surface. In operating I do not scrape the inner wall at all except around the Eustachian orifice, because the less you tamper with the inner wall of the promontory the less likelihood is there that scar tissue will form. If you leave the promontory alone you may find in some cases that for a long period it is lined with mucous membrane which gradually becomes normal, as in a "dry" perforation; but the hearing is much better than in those cases in which you get fine scar tissue growing up. So in a certain proportion of cases you benefit by not grafting. And if you can get skin to grow in normally over a bony surface, you are more certain of a permanent cure; normal skin will not grow where there is disease. If the skin grows in normally and completely lines the cavity within in eight or ten weeks, you may say that the patient is cured. Of course, our failures go to others; it is only the successful ones we keep. So I see cases of unsuccessful grafting, whereas my colleagues may see my unsuccessful cases of non-grafting. In a certain number of cases in which there is a small sclerosed mastoid, grafting seems to me to be quite unnecessary. Like Mr. West, I make a continuous cavity, removing the posterior wall of the meatus completely between the tympanic and mastoid cavities. I then fashion a Y-shaped posterior meatal flap, preserving the whole of the fibrous portion of the cartilaginous meatus, and if you cut it longitudinally a little below the median portion, you can throw this flap into the lower part of the mastoid cavity; this will often prevent the formation of granulation tissue between the tympanic cavity and the mastoid cavity, the area where, I think, trouble commences. I never make the concho-meatal flap, as it may cause a wide deformed meatal passage. If you are certain that the graft will take at the primary operation, as Mr. Marriage asserts, I admit that probably grafting is better than non-grafting, because it shortens the case. But if the disease is limited, and there is a small cavity, you can do just as well without grafting, and often the hearing is even better. If the deafness is due to mechanical obstruction, owing to the middle ear being filled with granulations, so that conversation is heard less than 12 feet off, you can promise, if you do not over-curette the promontory, that on recovery, ordinary conversation will be heard about 12 feet off. But if you do a radical mastoid operation on a person who hears at more than 12 feet (which should not often occur) the hearing is likely to be reduced afterwards. Formation of scar tissue about the stapes, whether the result of grafting or curetting, will considerably reduce the hearing.

MR. J. S. FRASER.¹

DR. DAN MCKENZIE: I have followed out the ordinary Thiersch graft method, described by Mr. Ballance, for four years. But if anyone supposes that skin-grafting of any kind is going to turn the ordinary radical mastoid operation into a satisfactory operation he will be disappointed. It does not accomplish anything in the nature of magic; it does not transform what is a difficult and tedious operation into a satisfactory one. What it does do, however, is to shorten the period of convalescence. After grafting, the cavity is more rapidly covered with epithelium, and the ear dries up quicker. The time taken in grafting at the operation takes so little longer that those who have begun to

¹ See p. 80.

graft continue to do so as a routine. The reason grafting has not become popular is that it is felt it is difficult to cut a graft. But in reality the difficulty is very much exaggerated. The chief necessity is a very sharp knife. With regard to subsequent hearing, that matter has been worked out by Welty, of San Francisco.

Dr. DUNDAS GRANT: I have not made a routine practice of grafting, but have done it in many cases. I have never regretted having grafted, but have frequently regretted not having done so. With regard to hearing, I am convinced, in company with Sir William Milligan, that the best results are seen after grafting. I had a good proof of this in a case in which both ears had to be treated for a similar condition, one with a graft, and the other, for certain reasons, without a graft. The hearing on the side grafted was very much better than on the other. It is difficult at first to believe that a primary graft placed on bare bone will take root and stay there, but it is now accepted that primary grafting is an excellent course to pursue. In some of the cases one sees now—for instance, soldiers—the patients have very coarse skins, and from them it is not easy to get a nice thin graft. The graft should be cut very quickly. There are cases in which Nature creates the equivalent of a graft, as in those in which, through long neglect, a cholesteatoma has formed, with a preservative matrix. It is a mistake to take that away and put another in its place. Ten years ago I brought a boy to the Otological Society in whom I had found such a cholesteatoma. A year afterwards I brought him up again to show how well Nature's graft had acted. It was dry at the end of a month, and skin was lining the cavity. A few weeks ago I was asked to see a soldier who had been under my care; it was this same boy, now developed into a strong Scottish soldier. He came because of deafness in *the other ear* owing to the bursting of a shell. The cholesteatoma-matrix had stood the hardships of months of campaigning, and was as well as if perfect skin-grafting had been done. Usually, of course, cases are now seen before a cholesteatoma has had time to develop. There are also cases in which the cavity is very small and grafting is scarcely called for. There is, on the whole, no method more perfect than the use of the Thiersch graft, as formulated by Mr. Ballance, and in the "primary" form as now described by Mr. Marriage.

Mr. W. STUART-LOW: After personal experience I would say I am not in favour of grafting. I used it for some time, but I got as good results without if I was careful. I think surgeons do not always take sufficient care in regard to a number of points respecting the mastoid operation. First, in regard to the preparation of the patient, I insist on tobacco and alcohol being stopped, and I give the patients a rest from work. I operate on the throat by enucleating the tonsils and removing the adenoids; a resection of the nasal septum is also done, if necessary, and consequently the patient is properly prepared for the operation. It is also important to remove bad teeth. I cut a large flap into the concha, and then there is a good deal of epithelium to lay down. This is laid down over the facial ridge, catgut stitches being put in to maintain the flap in position. Do not curette the inner wall of the tympanic cavity on any account, otherwise you will get scar tissue, and the hearing will not be good. I now use the blood-serum treatment. Having removed the diseased substance and dried the cavity, I put in 10 c.c. of horse-serum, and the cavity is packed with gauze and a dressing applied. To avoid contraction of the meatus I employ a cage, and a bandage over the cage. I have never had any contraction of the meatus since using this. Forty-

eight hours afterwards the plug is taken out, and no more after-plugging is ever required. If the epithelium is not coming on quickly enough, I blow into the cavity dry sterile powdered pig-skin epidermis.

Mr. MARRIAGE (in reply) : I have been very interested in hearing the views of different members, but I do not seem to have much to reply to. In the treatment of these cases, as regards the small details of technique, it is largely a matter of what one is used to, but as regards method the question is, Which one will give both patient and surgeon least inconvenience? From that point of view, I think there is no question that primary grafting saves the patient much pain and gets him well quickly, and saves the surgeon much trouble too. In the patient I showed this afternoon, healing occurred in five weeks, and I have only seen her three times since the operation; all the treatment she has had was done by the ordinary dresser at the hospital. That is a big contrast to the cases which we used to treat by plugging, or even with scarlet red; cases then required much more attention than that. In answer to Mr. Tod, one cannot guarantee that the Eustachian tube will be closed, and that there will not be some extension of mucous membrane. But by not scraping the inner wall of the tympanum at all he is much more liable to get trouble than if he had scraped. Still, even grafting will not always close the Eustachian tube, and I have never suggested that grafting will make all cases heal immediately. I think Mr. West is too pessimistic about putting grafts over a bony fistula. I have done many such cases, but up till now I have not had meningitis developing in consequence. I was glad to hear of Mr. Scott's method of transferring the graft; I have not myself tried it. I started with a section lifter, and got accustomed to that, and I do not think there is much difficulty. I was interested to hear from Mr. Scott in conversation that he had had a case of primary grafting of the mastoid which healed up in one week, and another in ten days. I do not profess to equal that, but I see that it can happen, because so often when you take out the first dressing, the whole cavity is practically covered, especially the bony cavity. The chief difficulty is the posterior meatal wall. Mr. Fraser's method, cutting out a crescentic piece, seemed from the description to be more complicated than cutting a straightforward graft. I would rather cut a graft and cover the whole cavity than put in a layer of skin and tuck it away in the manner described. I do not agree with Mr. Stuart-Low, that after grafting you get a contraction of the meatus; one of the advantages of grafting is that you do not get that contraction. Getting the skin to heal over the raw surface, at any rate in the upper part of the meatus, prevents it from contracting up, and I think Mr. Stuart-Low must have been unlucky in the way he cut his flap, or in his cases, if he has had many cases of contraction of the meatus.

Abstracts.

PHARYNX.

Gardiner, H.—Tonsils and Chronic Cervical Adenitis. "Lancet," October 2, 1915, p. 725.

From his own researches in thirty cases the author concluded: that in 80 per cent. of chronic cervical adenitis where no obvious source of infection is present the tonsils are infected. The size of the tonsil makes

no difference to their infectivity, except that the small fibrotic variety is likely to be more dangerous than the large. The number of cases in which tubercle bacilli are present is relatively small, but is larger than in simple cases of enlarged tonsils. The frequent presence of other organisms than the tubercle bacillus in these cases suggests that a large proportion of the so called chronic tuberculous glands are in reality chronic septic glands. The organisms are present in the deepest parts of the gland, and are therefore only removed by operations involving complete enucleation.

MacLeod Yearsley.

Viollet, Paul.—**Hypertrophy of the Uvula with Multiple Recurring Polypoid Excrescences.** "Proceeds. Paris Soc. of Laryngol., Otol., and Rhinol.," December 9, 1911.

On July 12, 1911, a man consulted the writer for throat trouble, which commenced about June 4. There was now an enormously swollen uvula, to the left side of which were attached three polypoid appendages varying in size from a haricot bean to a pea. He complained of general lassitude and extreme fatigue, unaccounted for by his occupation, which was not a tiring one. He constantly had the sensation of a fish-bone in the throat. Deglutition was difficult, and he was continually athirst. July 27: The cauterizer was applied, penetrating into the uvula and each of the polypoid prolongations. The throat was disinfected by gargling with hot water and phenosalyl twice or thrice daily. The tongue was very furred.

July 31: The uvula had improved in appearance, and the tongue was cleaner; but some excrescences still remained on the uvula, though they had decreased in size. November 13: The formations appearing larger, the galvano-cauterizer was applied a second time. November 27: The growths were still the size of a green pea. The interest of this case lies in its rarity. He is unable to discover any reference to such a condition in literature, moreover none of his colleagues had seen or heard of anything similar.

H. Clayton Fox.

NOSE.

Thomasson, Wm. J. (Newport, Ky.).—**Congenital Bony Occlusion of the Right Choana.** "The Laryngoscope," 1915, p. 321.

The patient had a congenital coloboma in the left eye. The left nasal cavity was large, the turbinals hypertrophied, and the septum deflected to the right. The right nasal cavity was narrow, the inferior turbinal absent, and the middle turbinal small and located lower down than normal. The right choana was completely closed by a bony plate which appeared to be an extension of the septum to the outer nasal wall. The patient, who was aged twenty-nine, had never discovered that he did not breathe like other individuals. The right middle turbinal was removed and a submucous resection of the septum performed. The incision in the septum was made well back, and extended from a point high up to the floor of the nose. The tissue was elevated on both sides back to the bony occlusion. The deflected cartilage and bone were now removed. The bony occlusion appeared to be an extension of the vomer. In order to get a flap to cover the floor of the choana he was about to manufacture, Thomasson made a curved incision (convexity upwards) commencing at the floor of the nose on the outer side and finishing at the septum. The semilunar flap was then brought forward and temporarily laid on the floor of the nose. In this way a good view was obtained for the removal of

the bony occlusion by means of the chisel and biting forceps. After a new choana had been made in this way, the flap was turned backwards over the denuded surface and the nose dressed.

J. S. Fraser.

Harmon Smith (New York City).—Blindness incidental to External Ethmoidal Operation. "The Laryngoscope," 1915, p. 216.

The patient had suffered from nasal obstruction and discharge for many years. An external ethmoid operation was performed on the left side by another specialist, the operation being associated with profuse bleeding and trouble with the anæsthetic, so that only one side was completed. When the dressings were removed, it was found that the right eye was markedly proptosed, and the lower lid was so chemotic that it covered the entire eyeball. Shortly after this the patient's sight failed. Harmon Smith first saw the patient a month later, at which time the chemosis of the conjunctiva was still present. There was also ophthalmoplegia externa, and the right pupil was moderately dilated and did not respond to light. The ophthalmoscope showed optic atrophy and a large subhyaloid hæmorrhage; even light perception was absent (report by Dr. Reese). Nasal examination by Harmon Smith showed a large oedematous mass protruding from the left choana. The left inferior turbinal was polypoid. The nasal septum was deflected and united with the left middle turbinal. The right side showed ethmoidal and sphenoidal suppuration with purulent blood-stained discharge. A radiogram showed involvement of both antra and ethmoids, as well as a piece of metal in the ethmoidal region on the left side. Smith thought the condition might be due to sarcoma, but microscopic examination of a piece of the growth showed it to be myxomatous. The polypi were removed at numerous sittings, the sinuses opened and drained, and the septum straightened. During this last operation a large perforation was found high up in the septum, and it was evident that the previous operator had perforated the perpendicular plate of the ethmoid. The metallic substance in the nose proved to be a piece of instrument which had broken off and which subsequently worked its way out of the nose. Harmon Smith suggests that the blindness may have been due to direct injury of the optic nerve, to hæmorrhage from the cavernous sinus, or to pressure due to induration of the tissue surrounding the nerve.

J. S. Fraser.

EAR.

Chatellier, M.—Abscess of the Brain: Exhibition of Specimens. "Proceeds. Paris Soc. of Laryngol., Otol., and Rhinol.," December 9, 1911.

The author reported a case of cerebral abscess of otitic origin, in which the autopsy showed a communication with the lateral ventricle. He laid stress upon the usual difficulties of drainage. From the discussion which followed, in which MM. Sieur, G. Laurens, and Veillard took part, the feeling prevailed that the drainage-tube should be dispensed with, for it was considered more harmful than useful.

H. Clayton Fox.

Girard, L.—Peri-Labyrinthine Cells. "Proceeds. Paris Soc. of Laryngol., Otol., and Rhinol.," December 9, 1911.

The author exhibited specimens of dry temporal bones, showing

through the opening of the radical mastoid operation, the cellular tracks which involve the labyrinth and extend as far as the apex of the petrous bone.

They are as follows:

(1) Starting from the base of the tympanum, extending under the labyrinth between the carotid canal in front, the jugular fossa (when it exists), and the aqueduct of the cochlea behind, and ending in the apex, under the internal auditory meatus below and behind it.

(2) Starting from the antero-superior region of the tympanum, passing in front of the cochlea along the carotid canal and Eustachian tube, to end in the apex of the petrosal bone below and in front.

(3) Starting from the inner wall of the aditus, extending around the ampullary branch of the superior semicircular canal, above the internal auditory meatus, and ending in the apex near the superior border of the petrosal bone.

(4) Starting from the antrum, the track extends with the antro-cerebellar canal into the loop of the superior semicircular canal, to end in the same position as the preceding.

(5) Starting from the antrum, it follows the superior border of the petrous bone, extends above the junction of the superior and posterior semicircular canals, and terminates at the same point as the two preceding.

(6) Starting from the antrum, it passes behind the posterior semicircular canal and above the aqueduct of the vestibule, then internal to the junction of the superior and posterior semicircular canals, to end at the same point as the three preceding.

(7) Starting from the inter-sinuso-facial region, passing behind the posterior semicircular canal and under the aqueductus vestibuli, to blend with the sub-labyrinthine tract. Thus one sees that the author has discovered numerous starting points, but only three ended in the petrous bone.

H. Clayton Fox.

Camille, Hubert.—*Elimination en bloc of the Semicircular Canals.*
 "Proceeds. Paris Soc. of Laryngol., Otol., and Rhinol.,"
 December 9, 1911.

A girl aged five and a half attended the St. Joseph Hospital on May 13, 1910, for bilateral acute suppurative inflammation of the middle ear and acute inflammation of the mastoid process of the left side. The ears had only recently discharged. The child was in full eruption of scarlet fever, and had a severe diphtheritic sore throat.

The left mastoid was opened the next day. Shortly afterwards the right membrana tympani was extensively perforated, but the right mastoid remained unaffected, and only the handle of the malleus was extruded. On the left side the ossicles necrosed in four or five days; the walls of the operated cavity, particularly the posterior wall of the meatus and tegmen antri were involved in the necrotic process; so much so that the dura mater was extensively exposed, and the radical operation was almost spontaneously performed. At the same time a cervical glandular abscess developed on the left side. A culture from this abscess showed the presence of Klebs-Loeffler bacilli. An injection of anti-diphtheritic serum and incision rapidly cured this suppuration. During all this period the child had never at any time exhibited vertigo or any symptoms to draw attention to the labyrinth. Her general health was such that a physical examination was impossible. September 10,

1910: Sequestra continued to form, most of them being eliminated. Finally, the deep wall of the antrum alone remained necrosed. It gradually separated, and on April 10, 1911, a large mass of dead bone was removed with Politzer's forceps. This mass, which represented almost completely the "solid angle" of authors, was made up of the three semicircular canals and a portion of the vestibule. One easily identified the external canal, owing to the fact that the jutting which it makes in the antrum and aditus was well preserved. The canal was open on its inferior surface (which is in relation with the facial nerve) in such a manner that it showed itself on the sequestrum as a semicircular groove.

The superior canal likewise was in the form of a semicircular groove. As to the posterior canal, it was incomplete, its ampulla being absent. On the inferior surface of the sequestrum there was a smooth depression corresponding to the superior wall of the vestibule. No form of complication, not even headache, followed this elimination. The facial nerve had always remained intact. The child is now completely cured on the left side. On the right there is still chronic otitis, which is, however, clearly tending towards recovery.

Labyrinthine tests (nystagmus and acoumetric) showed complete functional abeyance of the semicircular canals and cochlea of the left side. There was a slight diminution of muscular tonus on the same side. In this case the labyrinthitis evolved in an absolutely latent manner, the production of sequestra being, in short, a spontaneous cure. Thus, as is the rule in such cases (Noll, Bezold), elimination of the sequestra has been quite benign. Preservation of the facial nerve when the horizontal canal has been completely extruded is perhaps a rarer matter. Undoubtedly the stylo-mastoid artery supplies a portion of the osseous labyrinth, but it must not be forgotten that the osseous labyrinth shares its vascular supply with the membranous, whilst the facial canal is entirely supplied by the stylo-mastoid artery. This difference in the blood-supply perhaps in a measure explains the resistance of the parts to a necrotic process.

H. Clayton Fox.

Large, Second H.—Gold-Platinum inserted for Adhesive Processes in Middle Ear. "The Laryngoscope," 1915, p. 370.

Male, aged fourteen years, had enlarged tonsils and adenoids. Both drumheads were retracted and showed the signs of "chronic catarrhal otitis media." Left tympanic membrane adherent to inner wall and fixed in its anterior and posterior quadrants. Left ear = conversation voice at 1 ft.; whisper on contact. Operation under ether anæsthesia; two incisions—one in anterior and the other in posterior quadrant; drumhead separated from inner wall with angled knives; arrest of hæmorrhage; piece of platinum and gold foil, $\frac{1}{500}$ in. thick, was inserted—the anterior end protruding through anterior incision. Tonsils and adenoids removed at same sitting. Patient had considerable pain, which lasted thirty-six hours after operation. On second day there was foul discharge (mixed infection). Nurses noted improved hearing immediately following operation. Six weeks later all discharge ceased; left ear = conversation voice at 15 ft.; whisper, 3 ft. [The case would have been more convincing if the effect of the removal of adenoids had been observed for some weeks before the tympanic operation.—Abstractor.]

J. S. Fraser.

MISCELLANEOUS.

Whiteford, C. H.—Complete Branchial Fistula in an Adult. "Lancet," October 9, 1915, p. 818.

In a soldier aged thirty-two. Outer opening at inner edge of right sterno-mastoid, about an inch above the sterno-clavicular joint. A probe passed 5 in. into the pharynx and an injection of methylene blue stained the saliva.

Operation was successful.

Macleod Yearsley.

Thursfield, Hugh.—Status Lymphaticus. "Brit. Journ. of Children's Diseases," No. 131, vol. xi, November, 1914.

A criticism of the various views held as to the ætiology of this affection and the relationship which may exist between the thymus and other lymphatic structures, and the sudden death by which this affection may first reveal its presence.

From his own experience Thursfield is inclined to doubt the alleged frequency of so-called thymic dyspnoea, and that the other symptoms of this condition may rightly be attributed to pressure. Whilst admitting that our knowledge of this disease is still vague, he is inclined to believe in the deduction arrived at by Klose in the latter's experiments that the thymus is chiefly engaged in hindering the formation of, and in neutralising the excess of acid in the organism, and that the lymphatic state is not merely a disorder of the thymus, but a much more complicated disorder, involving the whole "ductless gland" system; further, that until we obtain a clearer conception of the inter-relations of these glands, we shall not progress in our understanding of this disease.

In the meanwhile our chief endeavour should be in the diagnosis of the disease, and especially in ascertaining if an hypertrophy of the thymus is present in all cases of children who are to undergo operation. The chief sign of such hyperplasia is an increased area of dulness over the *manubrium sterni*. The normal impairment corresponds to a V-shaped area scarcely transgressing the margin of the bone, whilst if the gland be enlarged this area extends for $\frac{1}{2}$ to $\frac{3}{4}$ in. to either side, and merges below with the cardiac dulness.

Other symptoms are unexplained attacks of dyspnoea, a persistently low vitality as evidenced by subnormal temperatures, and intolerance of exertion. The X rays are of value, though the author is of opinion that one cannot by this means distinguish the condition from lymphadenitis in the anterior mediastinum.

Gardner recommends the administration of thyroid extract previous to operation, but the author—though lacking actual experience—would prefer to give an injection of pituitrin just before administering the anæsthetic, so as to obviate the "shock" to which, in a broad sense, he attributes the fatal results met with in the lymphatic state.

J. B. Horgan.

REVIEW.

Chevalier Jackson on Per-oral Endoscopy and Laryngeal Surgery.

Per-oral Endoscopy and Laryngeal Surgery. By CHEVALIER JACKSON, M.D., Prof. of Laryngology, University of Pittsburg, etc. With 6 coloured plates and 490 other illustrations. The Laryngoscope Co., St. Louis, U.S.A., 1915.

Chevalier Jackson was the author of the first complete guide in book form to endoscopy of the air-passages and upper food-passages; it appeared in 1907 and was entitled "Tracheo-bronchoscopy, Œsophagoscopy, and Gastroscopy." A long-announced second edition is at last forthcoming, bearing the title "Per-oral Endoscopy and Laryngeal Surgery." The scope of the work has thus been extended by the inclusion of the external surgery of the larynx and trachea, which are not endoscopic procedures. The first part of the title is a happy and comprehensive one, as "Per-oral Endoscopy" comprises all methods of diagnosis and treatment carried out by endoscopes passed through the mouth, and therefore includes endoscopic pharyngoscopy, laryngoscopy, tracheoscopy, bronchoscopy, œsophagoscopy, and gastroscopy. It does not, however, include tracheoscopy and bronchoscopy performed through a tracheotomy wound, and it is interesting to note that Jackson has discarded these procedures since 1908. We shall refer to this point later, and here remark that not only does he discard the practice of what is usually known as lower bronchoscopy, but he also discards the terms "upper bronchoscopy" and "lower bronchoscopy" and substitutes those previously employed by an English writer, viz., "per-oral bronchoscopy" and "tracheotomic bronchoscopy." The latter method, though not favoured by Jackson and not comprised in the title, is nevertheless briefly alluded to by him in this work. On the other hand the subject of pharyngoscopy, which does come within the scope of the title, is not discussed in a separate chapter, and such inadequate references as are made to the subject are mixed up with laryngoscopy and œsophagoscopy. Moreover, recent improvements in endoscopic diagnosis and treatment of the post-nasal pharynx by Yankauer's and Hayes' pharyngoscopes are practically ignored. The various methods of gastroscopy, again, are scarcely adequately dealt with. On the other hand we can only write in terms of the highest admiration and respect concerning this monumental record of the author's own clinical endoscopic work in the larynx, bronchi, and gullet.

ARMAMENTARIUM.

In the section on endoscopes and other instruments, those which were described and illustrated in the previous work are not, for the most part, dealt with again; but such more recent modifications as have become generally popular are here described and illustrated. These include the proximal photophores (incorporated with the handle) of Kahler and of Brünings, the endoscopes of the latter, together with those of Paterson, Guisez, Mosher, Yankauer, Hill, and others.

The instruments employed by the author are for the most part the same as those introduced by him early in the century. He is still quite satisfied with Einhorn's small distal lamp method of illumination and

with the use exclusively of tubular endoscopes of small diameter; and it must be remembered that the small available lumen in his tubes is reduced by the presence of two lateral channels, one for the light carrier and one for suction of secretions. Jackson admits later (p. 342) that "a tube of large diameter is always preferable, because with it one is much less likely to over-ride a foreign body," but he adds that "a tube of large diameter is much less easy of introduction." Although his excellent pharyngo-laryngoscope has a large spatular end, the proximal lumen is only 12 mm. diameter, whilst his largest size œsophagoscope does not exceed 10 mm. outside diameter. Brünings' largest endoscope has an outside measurement of 13 mm. diameter, but this is further reduced by the presence of the extendable inner working tube. Paterson, realising this drawback, uses an inner tube merely to facilitate introduction—after which it is withdrawn—the working tube being the outer one, and considerably longer than Brünings' outside tube. Paterson on one occasion had to improvise an endoscope out of a tube used for a bicycle frame in order to remove a large bone from the œsophagus at the aortic level. This tube had a lumen of 20 mm. diameter, and this successful experience of Paterson suggested to the reviewer the practicability and desirability of employing œsophagoscopic tubes of 18 mm. internal diameter for use with Brünings' handle-attached photophore; the distal extremity is bevelled as in the original Mikulicz œsophagoscope, and five years' experience shows that tubes of such large diameter are as safe as they are efficient. Mosher has also in recent years advocated the employment of large diameter endoscopes, but his œsophagoscope is elliptical, not circular, on section, and although the transverse diameter is 20 mm. the antero-posterior one is much less, and so considerably reduces the efficiency of the instrument when large bougies and dilating instruments are employed, and also in the removal of foreign bodies.

Although Killian's suspension method of pharyngoscopy and laryngoscopy was early taken up with enthusiasm in the United States, and has been most favourably reported upon by all the most prominent laryngologists there, we find no internal evidence that Jackson has himself adopted the method, which is here described in a separate chapter written by Prof. Killian himself with his usual thoroughness and lucidity.

Of course, to one of Jackson's extraordinary manipulative skill and experience, the employment of small tubes doubtless suffices for all cases and presents no unsurmountable difficulty; but for those less fortunately endowed the advantages of a large field of exposure and plenty of room for the manipulation of forceps are not negligible, and most of us prefer to work with an endoscope of the largest calibre which can be inserted with safety into the air- and food-passages respectively. The use of tubes of large diameter is admittedly more adapted to endoscopic procedures performed under chloroform, and this brings us to the subject matter of the next section.

LOCAL AND GENERAL ANÆSTHESIA.

Jackson's views on the question of anæsthesia are well known, and were re-stated at the International Congress in London two years ago. "For per-oral endoscopy analgesia is not required, for the pain in careful work is exceedingly slight; but anæsthesia for the lessening of reflexes and for the lessening of apprehension which intensifies the reflexes is necessary under certain conditions." Under the term anæsthesia the author includes (1) the local application of cocaine, (2) the hypodermic

injection of alkaloidal sedatives such as morphia, atropine and scopolamine, and (3) the general anæsthetics ether and chloroform. One can agree that the use of alkaloids (1) and (2) is usually undesirable not only in infants, but in all children. Jackson, however, advises no general anæsthetic in children under six, even for laryngeal operations such as the removal of papillomata, and for prolonged foreign body extractions from the respiratory passages and gullet. One can understand the objection to ether, the favourite anæsthetic in America, but the prevalent English practice of carrying out the above-mentioned procedures in children under chloroform is not approved of by Jackson. Hence his method necessitates the use of tubes of small calibre, great skill in very rapidly carrying out manipulations, and a well-trained "team of assistants."

In adults no anæsthesia of any kind is considered necessary in œsophagoscopic investigations and manipulations. Cocaine is, however, sometimes advisable in laryngeal and tracheo-bronchoscopic procedures, to reduce spasmodic contractions and cough. Jackson never employs adrenalin, atipyrin or other adjuncts, nor does he countenance the hypodermic injection of morphia and the other sedative alkaloids even in adults. In the few adult cases in which a general anæsthetic is employed by him he gives no indication that he prefers chloroform to open ether in endoscopy of the air-passages; but he regards chloroform as contra-indicated in all cases of œsophagoscopy. In this country, of course, chloroform is regarded as the anæsthetic of choice in endoscopic cases, and either open ether or C.E. mixture is only exceptionally employed, as in debilitated subjects with weak hearts.

Considerable space is given to the endo-tracheal insufflation of ether with Elsberg's apparatus, a gum elastic tube being passed through the buccal cavity and larynx into the trachea. There are, of course, two methods of endo-tracheal insufflation anæsthesia, viz., that performed with a complicated apparatus *under pressure*, which is suited for ether but not for chloroform anæsthesia, and the method of insufflating either ether or chloroform or a mixture down the oro-tracheal tube, pumped in under slight pressure by Junker's apparatus or by the drop method on a gauze-covered funnel like that attached to Hahn's tracheal cannula, and connected up with rubber tubing with the oro-tracheal anæsthetic tube. The latter method without hyper-pressure is of course most suited to endoscopic practice, but their use is not emphasised nor even mentioned, while the former method—*i. e.* under pressure—is, on the contrary, illustrated and described in some detail.

Jackson restricts endo-tracheal ether anæsthesia in endoscopic procedures to gullet cases only. We agree with him that in œsophageal cases, more especially in those where there is laryngeal paralysis, it is wise to administer the general anæsthetic, when such is called for, through an oro-tracheal tube; but we do not admit that chloroform is contra-indicated in œsophagoscopic cases; for we have had it administered, not scores but hundreds of times, in such cases without a fatality; and often during the last four years through an oro-tracheal tube, but not of course under pressure. We fail to see the advantage of giving ether under pressure in œsophagoscopy; for the respiratory arrest which sometimes occurs during œsophagoscopy is almost always due to compression of the air-passages by the œsophagoscope, and this is obviated by the presence of the oro-tracheal tube, which prevents obstruction.

There are, however, conditions not mentioned by Jackson in which we have found that endo-tracheal ether under pressure is decidedly useful, namely, in sanguinary per-endoscopic operations in the deep pharynx and

on the margin of the pharyngo-laryngeal party wall. In surgical diathermy of this region ether is of course contra-indicated, but blood can be prevented entering the air-passages by insufflating warmed air under pressure; the anæsthesia being kept up independently by intermittent chloroform with Junker's apparatus.

The author apparently has not employed either the intravenous ether method or oil-ether per rectum, but he does mention that the latter has been used by the two Stuckeys. Both these methods have been employed in London (in cases where chloroform is contra-indicated) with apparent safety to the patient, and certainly to the great comfort of the operator.

A short chapter is devoted to the administration of oxygen both by a buccal tube and through a tracheoscope or through a gum elastic oro-tracheal tube, and the far greater efficiency of the latter method over the buccal is rightly insisted on.

THE CHOICE OF POSITION.

In no section of this work are radical changes in practice more noticeable, as compared with the former book, than in that devoted to the position of the patient in per-oral endoscopic measures. Formerly the author did much work with the patient in the bolt-upright sitting position. The illustrations are now all changed, and the inexperienced endoscopist, on comparing the early book with the new one, might well wonder how what then purported to be good work could possibly have been done in the old positions, and we question if they were invariably so very faulty compared with those now advocated as modern innovations. The fact is, of course, that the moderately forward position of the body, as used originally by Kirstein, and the still more forward position advocated by Mouret and others, have long been used, and even illustrated by endoscopists; but the forward position was not considered the *typical position*, and Brünings and others followed Jackson in carefully selecting for illustrations only those photographs which showed the axis of the endoscope in the vertical plane, and the explanatory diagrams aimed at bringing out this feature.

It must be admitted that in many cases where the laryngoscope is passed in the sitting position there is less strain on the surgeon and on the patient when the trunk is in a forward position varying from that of Kirstein to that of Mouret, and the axis of the endoscope makes an angle, amounting often to 45° with the vertical. It frequently happens, however, more especially in adults with short thick necks, that a good view of the larynx is not obtainable in this slanting position, and to obtain it extreme extension of the head with a bolt upright position of the trunk is necessary, that is to say, the position illustrated exclusively in the previous book and rigorously excluded from this new edition.

It will be found, however, that the illustrations of the author and his descriptions of the sitting positions are a work of supererogation, as he distinctly states that one of his objects is to overcome what he assumes to be "the general preference for the sitting position," and to advocate the routine adoption of the dorsal recumbent position both for children and adults, both for endoscopy of the air-passages and for œsophagoscopy. It is certain that a large number of British endoscopists have for years preferred to carry out nearly all serious work in the dorsal position on the table even when cocaine anæsthesia only was employed. For various minor procedures, however, more especially when patients have previously been proved tolerant to endoscopy, and it has to be

frequently repeated in the consulting room, the sitting position appears to fulfil all requirements. For those of us, however, who are in the habit of carrying out nearly all important endoscopic procedures, whether diagnostic or otherwise, under chloroform anaesthesia, the table position is of course a necessity, and it is then only a question between the dorsal and the lateral position. The latter terminology is often applied somewhat loosely. Jackson rightly condemns the true lateral position with the patient lying on his side as awkward, but it may be advisable in cases of special deformity, and it is strongly advocated by some for gastroscopy. Johnston and others wrongly use the term lateral position when they really mean that the patient is lying on the back and the head only is lateralised, as first advocated by Mosher, which is undoubtedly useful in certain circumstances. This is not the position to which Jackson means his condemnation to apply.

In his earlier illustrations of per-oral endoscopy with the patient in the dorsal position on the table, the object of the operator appeared to be to insert the endoscope, whatever its form (whether pharyngoscope, laryngoscope, tracheoscope, bronchoscope, œsophagoscope, or gastroscope), so that its axis should be in the horizontal plane and parallel to the table; and in order that this position could be attained the head of the table had to be lowered so as to allow the posterior part of the vertex and occiput to occupy a lower plane than the trunk. Roughly, this was the Rose position; but in Jackson's practice the head was not allowed to hang freely over the edge of the table but was supported by an assistant, who slightly raised or lowered it as required by the operator. This is known as the Boyce position. Jackson now teaches that these illustrations and directions were all wrong. He claims that he "was the first to call the attention of endoscopists to the fact that the trachea and œsophagus are not perpendicular" in the bolt upright position, and therefore, of course, their long axes were not in the horizontal in dorsal decubitus. These facts were, of course, clearly enough brought out in the diagrams of the Anatomical Text-Books, but it is true that prior to the author's paper in 1909 the illustrations in endoscopic literature, including Jackson's own, appeared totally to ignore such facts. Since that date illustrations by Johnston, Hill, and others have depicted the axis of the œsophagoscope as more nearly approaching an angle of 45° with either the vertical or the horizontal, when the upper two-thirds of the gullet are under examination. In endoscopy of the lower fourth of the œsophagus and of the stomach the axis of the tube becomes more or less vertical or horizontal according as the patient is sitting or on the table. The writer described and illustrated these changes in the axial position of the endoscope in its passage down the gullet early in 1912. This procedure turns out to be identical with what Jackson now terms *his* "high-low method." From these observations it will be seen that when the patient is recumbent on the table the head should not be lowered to the Rose position or to the modified Rose position of Boyce. All that is required is to extend the head by putting the first joints of the fingers in the mouth and making traction on the upper alveolar region horizontally away from the head of the table; this extends the head at the occipito-atloid joint without interfering with the position of the cervical spine, which slopes gently downwards. This extension of the head without altering the curve of cervical and upper dorsal spine serves to bring the axis of the bucco-pharyngeal cavity into line with that of the upper half or two-thirds of the œsophagus, and it is then an easy matter to pass an endoscope through the right angle of the mouth, advancing by the right

side of the tongue through the buccal cavity and pharynx to the right pyriform fossa, then through the post-cricoidial pharynx, past its postero-inferior lip *below* which is the mouth of the gullet, which is seen opening and shutting with respiration. If the lumen of the gullet is not seen several inches ahead we are not in the right axis. Jackson does not tell us in so many words that when the direction of the endoscope is not in line with that of the gullet that we can get the line most often by actually raising the head rather than lowering it, that is to say, the end of the œsophagoscope is against the anterior or juxta-tracheal wall rather than the posterior or juxta-spinal. Of course these changes had equally to be made to get the line of the lumen before Jackson recalled the attention of endoscopists to the direction of the gullet in the dorsal decubitus, but writers ignored these positional points in their description and illustrations, and the latter were made to conform to preconceived notions that the axis of the endoscope should conform more or less to the horizontal when the patient was lying on the table.

It is tempting to infer, as Jackson apparently does, that what is true of the gullet is true also of the trachea, which occupies a position parallel and immediately in front of it; but this is not so, as the straight path to the vestibule of the larynx is interfered with not only by the overhanging epiglottis, but also by the adjacent base of the tongue, and these structures, even when they are drawn forcibly forward, often prevent the exposure of the anterior third of the glottic region when the occiput is resting on the table. To expose fully the anterior commissure, it is necessary more often than not to drop the back of the head below the level of the table, as in the Killian position of suspension laryngoscopy. This position is much the same as the Boyce position of Jackson, and until it is clearly demonstrated that Killian and his followers are wrong, most endoscopists will continue to hold that the table position advocated by Johnston and Jackson for laryngoscopy is not the best for the general run of cases. In per-oral tracheo-bronchoscopy, as the tube has to traverse the buccal cavity, pharynx, and larynx, it follows that the head should first of all be in the Killian position until the endoscope has passed through the glottis; the head should then be raised to such a height as will bring the axis of the endoscope and of the tracheo-bronchial passage into a direct line.

After describing in detail for the use of beginners the various stages of the passage of the direct laryngoscope in the middle line, he draws attention to the advantages of the oblique route; the endoscope being inserted near the corner of the mouth, passing laterally through the buccal cavity by the side of the tongue, the distal extremity taking an oblique course from the angle of the mouth through the pharynx to the vestibule of the larynx. Those of us who resort to this position even more frequently than the central one will agree with Jackson's surprise at Brünings' theoretical objections to it. One more often finds in adults, at all events, an absence of teeth in the upper lateral alveolar region, and there is less resistance from the tongue and floor of the mouth by this route. To sum up, the route is usually a shorter and easier one, and if the head is rotated to the opposite side and slightly bent over towards the shoulder the obliquity of the vestibular approach is almost negligible.

This lateral route was used by Mikulicz in œsophagoscopy and gastroscopy more than thirty-five years ago, and Jackson actually reproduced a diagram by Mikulicz showing this; and in view also of Brünings' mention of this method of laryngoscopy (though to condemn it), one is rather surprised at Jackson claiming (p. 421) this as the "Author's

method." Perhaps he really had in mind to state that it was the method favoured by the author rather than originated by him.

Another so-called "Author's method" which appears to belong to the same category is what Jackson designates the ex-tubal method of laryngeal operating. In this long known, but possibly not very widely known method, the endoscope is passed either in the central position or else midway between the central and lateral oblique position, and the laryngeal vestibule exposed and illuminated; the forceps, or a bronchoscope, or an intubation apparatus, as the case may be, is then passed down *outside* the endoscope through the corner of the mouth, and then in a lateral oblique direction to the larynx. The laryngoscopes with a lateral slot are especially adapted to this method of manipulation, as they admit of unobstructed binocular vision. After considerable experience in the employment of this method we can corroborate Jackson's claims as to its usefulness in manipulating large forceps and in dealing with large foreign bodies in the vestibule, and with large tumours. It would doubtless also prove useful in carrying out per-endoscopic evisceration of the larynx in extreme cicatricial stenosis, and also in posticus paralysis. This evisceration method of Jackson would not on *a priori* grounds appear to be very promising, in view of the frequent failure of thyro-fissure eviscerations, even when special and prolonged post-operative measures are adopted, but the author has two successes out of five cases so treated, which justifies his remark that "the method is worthy of trial before resorting to laryngostomy" in cicatricial stenosis.

The difficulties which may confront the expert as well as the beginner in laryngoscopy and bronchoscopy, both in the adult and in the child, are enumerated and discussed in a manner which proclaims large experience, acute observation, and craftsmanship of the highest order.

THE TRAINING OF THE ENDOSCOPIST.

The chapter on acquiring skill by the beginner necessarily affords little scope for criticism or comment. In his earlier book the author recommended practice on Killian's model and on tolerant patients in out-patient clinics. Endoscopy on narcotised dogs was then just mentioned as an optional procedure. In the present volume Killian's model is not even referred to, but practice on the dog is now not merely declared to be compulsory, but "no one should think of attempting for the first time to remove a foreign body from a living human being until he has at least one hundred times removed a foreign body from a dog"! Fortunately we in this country are spared the necessity of challenging this pronouncement, as the legislative restrictions to experiments on animals acts as a check to budding endoscopodists trying it on the dog. It will be generally agreed that practice on the human cadaver which is now advised, though not referred to in the previous edition, is a useful exercise, more especially for acquiring acquaintance with the ramifications of the endobronchial tree. In the absence of muscular tonus and resistance, and the changed endoscopic appearances due to spasm and absence of turgescence, the limitations to the instructional value of this method are evident. Moreover, bodies in the *post-mortem* room in the state of *rigor mortis* offer difficulties due to the rigidity of the jaws and spine, which have little counterpart in the living subject. Flaccid dissecting room bodies are to be preferred, but changes in colour of the part and absence of muscular tonus and resistance reduces the value of such exercises. Beginners here have mostly relied in the past on the practice of direct-

laryngoscopy and pharyngoscopy in the first instance on tolerant cocaineised human subjects in the out-patient clinic, working, of course, under the guidance of an expert. Later excursions into the air-passages and gullet can be carried out on patients who have been placed under a general anæsthetic for some endoscopic procedure, diagnostic or otherwise.

DIRECT LARYNGOSCOPY.

In defining the field of usefulness of indirect mirror laryngoscopy and of direct laryngeal endoscopy, the author emphasises the employment in the first instance of the mirror for diagnosis wherever it can be carried out, and this, of course, can usually be done except in young children. In drawing attention to the fact that the endoscope gives a better view of the anterior aspect of the posterior wall, he recalls the fact that even this area can often be seen "by using the mirror with the patient standing and the observer kneeling, the patient's head being bent forward and downward toward the observer." This method is ascribed to Killian, but Morell Mackenzie described a method similar in principle so far back as 1880 ("Dis. of Th.," etc., vol. i, p. 502).

"When it comes to operations, however, the indirect method has no place in the author's technique." He naturally acknowledges that much successful operating can be done, and has been done, by others with the aid of the mirror, but asserts that the same amount of practice will accomplish "equally marvellous results with the direct method as were accomplished by the indirect, and *the results will be vastly greater because of the greater possibilities of the direct procedure.*"

Jackson's laryngeal endoscope being a complete tube proximally he is confined to monocular vision, which is a disadvantage in operating compared with the binocular vision available in open spatulæ (Kirstein, Ingals, Mosher), and in those with a lateral slot (Hill, Mosher, Dickinson, Brünings).

"The laryngoscope must always be held in the left hand, never in the right." This applies to the actual insertion of the instrument, and it is not permissible to use the right hand for insertion and diagnostic purposes and then change hands for operating, which is commonly practised by the Killian school. It will be remembered that in Brünings' numerous photographic illustrations of endoscopic procedures the latter are always shown held in the *right* hand during insertion. It is desirable to practise ambidexterity, but Jackson's rule will probably be regarded as far too rigid by many genuine experts.

We are afraid that if a medical man who had never had an opportunity of seeing any endoscopic practice were to read this book, he would be driven to conclude that the ordinary passage of an endoscope into the vestibule of the larynx or into the adjacent air-passages and gullet was an extremely difficult and highly technical procedure, demanding long training and necessitating the co-operation of a team of very experienced trained assistants. On reading the writings of Waggett, Tilley, and others he would be led to conclude that any surgeon, who was fairly handy with his hands, could, with a little patience, get the hang of the method in a very short time. Perhaps the truth is somewhere between these extremes, but personally we think that it lies very much nearer the pronouncements of Tilley and Waggett than those of Jackson. In expressing this opinion we fully admit that many of the endoscopic feats recorded by Jackson in dealing with, for instance, some foreign bodies, demands handicraftsmanship and originality in surgical resource of the highest order.

ENDOSCOPIC EXTRACTION OF FOREIGN BODIES IN THE AIR-PASSAGES
AND GULLET.

More than 200 pages, that is to say, more than one-third of the endoscopic portion of the volume, are devoted to foreign bodies in the air-passages and upper food-passages. The ratio of foreign body cases to actual anatomic lesions in the areas dealt with is, in our experience, much less than this; only in the tracheo-bronchial tree do foreign body cases actually predominate. But we find no fault with the space allotted to dealing with foreign bodies, as they often present problems of the greatest difficulty, and much of the special endoscopic technique is common to foreign body cases and to those with organic lesions.

Brünings, in his admirable work on endoscopy of the air passages and upper food-passages, was, apart from descriptions of technique, strong on foreign body cases, but did not give one the impression of a very large and varied experience in dealing with organic lesions, more especially in the gullet. Jackson also is more exhaustive in his treatment of foreign body cases than in dealing with organic lesions, but he is immensely strong on the clinical side in all directions, more especially in lesions of the gullet.

The author has considered it convenient to deal with foreign body cases in the air passages and in the gullet in *ten* consecutive chapters.

The application of Röntgen ray examinations and the interpretation of screen views and of photographs in cases of difficulty is dealt with almost exhaustively. Although there are reduced tone reproductions of no less than ninety-four skiagrams distributed throughout the book, it cannot be said that one is superfluous, as each demonstrates some special point. Preliminary radiography is advised whether the foreign body alleged to be present is likely to show on the screen or not; as it is rightly pointed out that the presence of a foreign body which is not opaque to the rays may be indicated in the skiagram by a dark patch as in an accompanying bronchiectatic cavity or an area of inflammation. The skiagram will also sometimes show marked diminution in the excursion of one side of the diaphragm where a translucent foreign body blocks a lower lobe bronchus. Moreover, when a radiographically non-opaque foreign body is reported to have been impacted, it may turn out that a mistake has been made and that a body of quite different shape and density has really been inhaled. The necessity of making both antero-posterior and lateral examinations is insisted on, but curiously enough the right antero-lateral oblique position is neither illustrated nor even mentioned. This in this country is considered the position of choice in cases of foreign bodies and other lesions of the œsophagus. The postero-anterior and the left postero-lateral oblique positions are also occasionally useful, but are not alluded to. We think the author has been badly served by his radiographic colleagues in using only the antero-posterior and lateral positions, though their skiagrams taken in these positions are excellent. Mention is made of a double-plane fluoroscope devised by Grier, made up of two screens fixed at right angles, but unfortunately the method of utilising this arrangement is not described.

The combined and simultaneous employment of endoscopy and of radioscopy in foreign body cases on the X-ray table has been used with success by the author. This method has been occasionally resorted to here since 1909 by Tilley and others for guiding the end of the bronchoscope and the jaws of the forceps to the vicinity of the foreign body in difficult cases where there are excessive secretions, or where the foreign

body is embedded in inflammatory tissue, or is at an awkward angle in a lateral branch.

The caliper guide of Boyce, which appears to be similar in principle to the original instrument of Brünings, is recommended for bringing the distal extremity of the endoscope into relation with a small foreign body impacted in a small lateral bronchial branch, thus saving much useless exploration.

There is an excellent summary of the errors to avoid in suspected foreign body cases, which is too long for quotation here.

The employment of magnetic attraction advocated by Iglauer and by Lynch is shown to be useless in the only cases in which such a cumbersome aid would be resorted to, viz., the difficult ones.

"There is no absolute contra-indication to bronchoscopy" in foreign body cases, not even gangrene of the lung, much less pneumonia; though the sittings should not be prolonged, more especially in infants, when there is marked pulmonary disease and debility. "Aneurysm, serious cardiac and vascular diseases, high blood-pressure, history of apoplexy, and the like are not contra-indications for the cautious endoscopic removal of foreign bodies, but they render *oesophagoscopy* for any other purpose inadvisable."

For Jackson, bronchoscopy now always means per-oral bronchoscopy, as he has not himself resorted to a preliminary tracheotomy since 1908. No doubt he would utilise the lower route if he found a tracheotomy ready to hand, the trachea having been previously opened by another. It will be remembered that some years ago Killian collected the published records of eighteen cases in which either tracheotomy or intubation had to be resorted to subsequent to per-oral tracheo-bronchoscopy in children under four years of age. We have ourselves had to resort to post-bronchoscopic intubation of the larynx on one occasion, and we know of similar unpublished experiences; and the total number of such unpublished cases is probably large. The fact that Jackson prefers the laryngeal route even in infants, and that he does not mention that subsequent laryngeal obstruction has occurred in his more recent practice, can probably be accounted for in part by his custom of avoiding prolonged sittings, preferring two or more short ones; and there are also the important factors of gentleness and rapidity of work which can only be reckoned on in those possessing both natural skill and considerable experience. Jackson believes that the absence of laryngeal swelling after his own bronchoscopies in infants is due to the fact that he uses distal illumination, thus enabling him to see better and to work more rapidly, and also to the employment of light tubes of small calibre which admit of delicate handling. He assumes that proximal illumination necessitates the use of the largest tubes which can be inserted according to the size of the child, and he points out that the heavy handle-photophore of Brünings implies heavy handling and unavoidable pressure amounting to traumatism on the delicate infantile larynx.

In view of the character and source of these pronouncements, it becomes a question whether those who have not hitherto used Jackson's light type of bronchoscopes in young children ought not to reconsider their position.

Brünings, on the other hand, after considerable experience, has altogether abandoned per-oral bronchoscopy in infants. And he considers severe dyspnoea an indication for preliminary tracheotomy not only in children, but even in adults where the heart and lungs are not sound, on account of the strain on the tongue and neck produced during the intro-

duction of the tube. Brünings likewise prefers per-tracheotomic bronchoscopy in "moving foreign bodies." For those who have had very slight experience in per-oral bronchoscopy, and who therefore require to take their time, we think that even Jackson would agree that the per-tracheotomic route is the most justifiable one in young subjects.

Jackson mentions the effect of suction on a case recorded by Tilley, in which a moistened pledget of wool on a holder was passed down the bronchoscope, the distal end of which was in contact with a green pea; the cotton wool on the holder acted as a piston on withdrawal and sucked the pea into the endoscope. Jackson leaves the question of aspiration at that. Brünings, however, had previously discussed the suggestion made by others of using suction through an air-tight bronchoscopic tube, and he argued on theoretical grounds that sufficient negative pressure could not be attained to move an impacted vegetable body. Soon after Brünings' book appeared two pieces of chestnut were shown at the Laryngological Section of the Royal Society of Medicine which had been extracted through a small metal tube passed through the bronchoscope into contact with a piece of chestnut just projecting from the left upper lobe bronchus; the proximal end of the tube was connected with an exhaust bottle, and on suction being made two pieces of chestnut were brought away. This method, therefore, is worthy of further notice and development.

Gottstein has recommended the employment of a different pneumatic method. A small metal tube with a hook-like end is passed beyond the vegetable foreign body, and positive air pressure employed to blow the body upwards. We are not aware, however, that this method has any recorded success to its credit, so perhaps Jackson is justified in ignoring it.

There is a highly valuable and well-illustrated chapter on various ingenious mechanical devices resorted to by the resourceful author in his extraction of bronchial foreign bodies of awkward shape and location. These are too numerous even to summarise satisfactorily, but we must mention the clever curved spring forceps for passing up the upper lobe bronchus, whose direction is, of course, such as to prohibit endoscopic exploration. The jaws are curved like the end of a hockey stick, but have sufficient spring to enable them to be straightened out in the passage of the forceps through the bronchoscope, but will spring out to their original curved shape after emerging from the distal extremity of the endoscope. Near the end of the forceps cannula is a spiral flexible tube, which can be made to pass over the curved jaws and close them. This method is used in combination with Grier's double plane method of fluoroscopy before mentioned.

There are two highly instructive chapters on foreign bodies in the bronchi for prolonged periods and on cases of unsuccessful bronchoscopy occurring in the author's own practice. Small inhaled bodies may become encysted near the periphery of the lung and cause no further trouble. On the other hand a small, and even a large, body may form an isolated cold abscess and remain "pocketed" for years. A pin which does not cause obstruction may not cause secondary changes for months or years. It will tend to advance to the periphery, and may in time set an abscess which may burst into the pleural cavity just as other foreign bodies may do. Larger foreign bodies which are not followed by early fatal lung complications lead to an abscess cavity below and a bronchiectasis above the stricture, with either continuous or intermittent expectoration of pus. This state of affairs may last for years, but will ultimately prove fatal

unless the breaking down of tissue leads to loosening of the body and its expulsion by coughing. These several fortunate contingencies are held, however, to be so remote that an expectant attitude is unjustifiable where there is any morbid expectoration, and bronchoscopy is then urgently indicated. The author gives notes of many long-standing cases successfully treated by him by bronchoscopy.

"After two expert bronchoscopists have failed to find the foreign body, the intruder should be removed by external operation." "Thoracotomy is certainly preferable to taking the chances of leaving the foreign body alone," "and the sooner after the bronchoscopic failure the better." Acting up to these clear, if heroic professions of faith, Jackson has had four out of his five unsuccessful cases submitted to lateral thoracotomy transpleural pneumotomy, but with three deaths. He does not, and perhaps cannot, refer to any collective statistics of the mortality after thoracotomy pneumotomy for foreign bodies by experienced chest surgeons. Until such statistics are forthcoming, Jackson's above-quoted dictum, that "thoracotomy is certainly preferable to taking the chances of leaving the foreign body alone," will hardly be accepted by many without qualification. Jackson has in view, it is only fair to state, a rapid thoracotomy performed by an operator thoroughly skilled and experienced in the surgery of the chest; for he asserts that "the operative risk is greater than the square of the duration of the operation." The statement that after bronchoscopic failure the sooner thoracotomy is performed the better, seems to us to require qualification; for surely the general condition of the patient, the state of the lungs, the area of pulmonary tissue occluded, and the site, size, and nature of the foreign body would be factors worthy of prudent consideration before rushing into an immediate thoracotomy.

Foreign bodies in the gullet are discussed immediately after those in the air-passages, and the author sums up the whole subject in a tabular statement of 126 cases successfully dealt with by him, together with a drawing to size of the foreign body or bodies removed in every case.

BENIGN GROWTHS OF THE LARYNX.

Indirect endo-laryngeal operating, guided by the throat mirror, has "no place in the Author's technique." He recognises that a more eclectic attitude is adopted by many laryngeal operators, and mentions *inter alia* the following British specialists who resort either to direct or to indirect methods, according to the nature of the case, viz., Dundas Grant, StClair Thomson, and Tilley. He foresees that the future generation of laryngologists will not have the "incentive to spend a lifetime at the practice necessary to acquire skill" in indirect laryngeal operating. In view of the introduction of Killian's suspension method of laryngoscopy we think that forecast will prove correct. It will be remembered that two years ago Dan McKenzie most trenchantly defended the attitude of those who followed Jackson in relying solely on the direct method in endo-laryngeal operations.

Jackson agrees with StClair Thomson that external operation should almost be "unheard of in the treatment of simple laryngeal neoplasms in adults, and should be resorted to only when an expert has failed *per vias naturales*." He quotes Semon as agreeing with him that thyro-fissure is rarely justifiable even in recurrent multiple papillomata in children. Long-continued vertical laryngostomy is only indicated, he

teaches, in cases where injudicious thyro-fissure has led to cicatricial laryngeal stenosis.

"Endo-laryngeal extirpation of papillomata in children is practically limited to the direct method." No local or general anæsthesia is employed as a rule. If for any reason a general anæsthetic should be required, a tracheotomy should be first performed in every such case! In many patients, of course, the obstruction is so great when cases are brought to hospital that tracheotomy is indicated for safety's sake. In reference to tracheotomy as a method of treatment in itself for papillomata in children, Jackson remarks that it is markedly beneficial in some cases and disappointing in others. "The author has had the best results from a combination of the alcohol application of Delavan between excisions by the direct method and with tracheotomy in all cases that persistently repullulate."

Mention is made of radium applications in papillomata as advocated by Harris. So large a dose as 200 mgrm. of radium bromide, or its emanation equivalent, should be applied for twenty minutes in a rubber-coated metal container, the latter being 2 mm. thick. As the screening power of the metals usually used in filters, viz., platinum, silver, and lead, varies as their density, the nature of the 2 mm. thick metal should, of course, have been specified. We believe, however, that platinum screens are usually used in America.

Jackson has "had excellent results in the treatment of sessile vocal nodules by touching them with a fine galvano-cautery point, as recommended by Wylie." He agrees, however, with StClair Thomson that caution and dexterity is requisite in dealing with a patient to whom the voice is a valuable asset. For larger growths the author uses what he calls his "tissue forceps."

ENDOSCOPY IN MALIGNANT DISEASE OF THE LARYNX.

Endoscopy is not employed by Jackson in cases of malignant disease for purposes of endo-laryngeal extirpation, as advised by a small number of laryngologists in very small and early growths, but exclusively for the purposes of deciding on the limits of the growth in order to determine whether it is suited for extirpation by external operation. In doubtful cases a specimen can be removed through the endoscope for microscopic inspection, but, in agreement with Semon, only if the patient has consented to undergo operation on microscopical confirmation of its malignant nature.

"The decision as to the operability of any laryngeal malignancy depends on whether the party wall is involved or not." This statement might at first sight be presumed to apply to the question of the possibility of radical removal by thyro-fissure of malignant growths of the vocal cord area; and most specialists would agree that involvement of the laryngo-pharyngeal party wall renders complete extirpation by the thyro-fissure route less certain, but it is quite another matter when the author states "that involvement, no matter how slight, means that the patient's chances are slender no matter how radical the operation, because of the free lymphatic leakage." This clearly implies that Jackson is prepared to veto either a partial or complete laryngectomy *if either side* of the laryngo-pharyngeal party wall is involved, and emphasises the importance he puts on a careful laryngoscopic and pharyngoscopic examination by the direct method.

This limitation of external laryngectomy to those growths which stop short of the laryngo-pharyngeal party wall will not be generally accepted in this country.

In addition to endoscopic determination of the limits of a malignant growth originating in the larynx, Jackson employs the direct pharyngoscope and laryngoscope for making applications of radium and for surgical diathermy, to the interior of the larynx, to the deep pharynx, and to the common party wall. The technique of these two latter palliative methods is unfortunately not given in any detail.

BENIGN AND MALIGNANT TUMOURS AND OTHER LESIONS OF THE TRACHEO-BRONCHIAL TREE.

The number of cases coming under the above heading (*i. e.* apart from foreign bodies) dealt with by any one specialist, even with a large endoscopic practice, is bound to be relatively and actually small, but the value of the three chapters on these subjects, which unfortunately are not consecutive, have been greatly enhanced by the fact that some of the more important records and experiences of others have been laid under contribution.

Jackson lays down wide indications for resorting to tracheo-bronchoscopy: (1) In foreign body cases. (2) In all cases of bronchiectasis for diagnosis of the presence of a foreign body and for its removal, and for the diagnosis of an accompanying stricture and for its treatment by divulsion or by intubation. (3) In every case of dyspnoea, *including asthma*, but excepting "pneumonia and similar well-understood conditions." (4) In every case where the insertion of a tracheotomy cannula does not relieve dyspnoea. (5) In all cases of hæmoptysis, which are not definitely tubercular, for diagnosis and treatment. (6) In recurrent nerve paralysis of obscure origin. (7) "In any case of thoracic disease in which any element of doubt exists."

"Unless there are urgent indications, it had better not be done except for foreign bodies in case of aneurysm, high blood-pressure, advanced heart disease, pulmonary tuberculosis."

No anaesthesia of any kind is used in children; in adults the larynx can be cocaineised, but at least one examination of the lower air-passages should be made without cocaine. The recumbent position is advised in children and the sitting in adults, though in the latter the patient should be examined in both positions "for obtaining scientific data." The latter applies to asthmatics, for instance, and bronchoscopists are urged to study "during the attacks every case of asthma available. Bronchoscopic accomplishment here promises to be second only to that in the field of foreign body extractions." It is absolutely necessary, we are told, "to start with the mind blank to previous theories," more especially as regards "spasm of the muscles of the bronchial walls" and "swelling of the bronchial mucosa," etc.

Jackson has apparently only succeeded in inducing two of his asthmatic patients to submit to an endoscopic examination during an attack, and we are not surprised to find that he drew blank, as no practicable bronchoscope is able to reach the bronchioles which are the seat of the obstruction, whether due to spasm or to tumefaction. Physical examination of the chest does not support the view that there is obstruction in the larger bronchi such as could be reached by the bronchoscope in true paroxysmal asthma. Jackson, however, testifies, it is interesting to note, to the relief afforded by the mere passage of

the bronchoscope without medication, thus confirming the observations of Ephraim and others: whether the relief is due to removal of secretions or to a reflex bougie effect, or to the combined effect, is a matter of speculation. Applications of orthoform emulsion, propäsin, supra-*renin*, or *novocain* are, it is alleged, more successfully administered through a long bronchoscopic atomizer than by the intrachael syringe method.

We may be wrong, but we leave this subject with the general impression that Jackson's pronouncements on spasmodic asthma and its bronchoscopic treatment are not founded on any considerable experience of such cases. Those who have hitherto not accepted these claims will not find them any more acceptable after reading Jackson on the subject.

Jackson's adventurous excursions mark a new departure in tracheo-bronchoscopy, and have enabled him to draw up what he claims to be a fair account of the local appearances in influenzal tracheitis. The early stage of redness of the mucosa is followed by swelling. "Later an exudate forms, at first serous, then mucoid, then purulent, and finally thick and tenacious, and exceedingly difficult of expectoration even by the robust adult." "In infants the bronchi or even the trachea itself may be occluded by mucosal swelling or oedema actually causing death by stenosis." Superficial erosions and blood-clots have been seen by the author in a number of cases. The only difference between influenzal tracheitis with exudation and diphtheria lies in the absence of "any true adherent membranous exudate." Much stress is laid on the following facts: That in this condition in some infants there is inspiratory stridor without laryngeal obstruction; there is absence of the cough reflex; there is severe inflammation of the trachea and larger bronchi without pneumonia; on account of inhibition of ciliary action the little patient is apt to be drowned by his own pulmonary secretions. Illustrative cases are alluded to.

The author regrets that tuberculosis below the larynx "has not received the amount of endoscopic study that the scientific value of the data thus obtainable would warrant"!

"Endoscopy may afford the only means of locating and diagnosing hæmoptysis" in cases where objective signs of tubercnlosis are absent. The author found a luetic lesion in three cases. Malignant lesions and varix of the trachea and aneurysm have been thus discovered by others, it is stated. He, however, admits that in a number of his cases the source of the blood has turned out to be a tuberculous lesion after all.

The various causes of compression stenosis of the trachea and larger bronchi and the endoscopic findings are well described. The normal respiratory up-and-down movement of the carina is, it is alleged, of "great diagnostic importance, because it is interfered with by various peri-tracheal and peri-bronchial conditions. The fixation is greatest in cancer; somewhat less so in cases of masses of tuberculous glands, unless these have suppurated, and the movement is only slightly interfered with in aneurysm." These assertions, to say the least, require checking by a considerable number of observations by competent observers.

Considering Jackson's reputation as an endoscopist in general and a tracheo-bronchoscopist in particular, readers will hardly be prepared for a disappointment in the chapter on benign growths of the endo-bronchial tree. The author tells us, however, that he has himself dealt with only two true neoplasms, though he has seen a number of benign growths not truly neoplastic. We conclude that under the latter heading he includes

granulomata, granulation polypi, œdematous polypi, tuberculomata and syphilomata. Of these we should have assumed that the most familiar to per-oral endoscopists would be post-tracheotomic granulomata and polypi developing from them. Curiously enough Jackson, whilst mentioning granulomatous and œdematous polypi, does not allude to their frequent post-tracheotomic incidence. The recent records of others in endoscopic methods in benign growths might have been laid under more extensive contribution with advantage, seeing that the personal experience of any one observer, even in large practice, is bound to be so limited. On the other hand, it may be argued that not only can the presence of a benign growth be easily made out with the aid of the endoscope, but it can also be easily and successfully treated through it, and there is little justification for padding this section by adding accounts of collected records and the subsequent microscopic findings. It would, however, be most instructive to have a collective investigation on the question of recrudescence. There is nothing in this chapter to lead one to suppose other than that a growth having been removed through the endoscope there is an end of the trouble. We admit that such is our own experience, a very limited one, however, but we would have liked information on this point without having to go through the literature.

ENDOSCOPIC PROCEDURES IN THE LOWER PHARYNX AND IN THE ŒSOPHAGUS.

In accordance with the clinical arrangement of his subject-matter which has commended itself to the author, we find that chapters on endoscopic procedures in various morbid lesions of the œsophagus are not grouped consecutively, but are scattered throughout the book. Jackson regards the throat, tracheo-bronchial tree and gullet as three divisions of a Y-shaped area which for purposes of descriptive endoscopy is best treated as one. Thus the endoscopic extraction of foreign bodies in this tri-une area is first considered. Then benign tumours in the three areas are consecutively dealt with: then malignant tumours: then lesions of the throat, tracheo-bronchial tree and gullet, other than foreign bodies and tumours. We here propose to deal with this scattered endoscopic material on the gullet as if the chapters had been consecutive and in the conventional sequence. And, following Jackson, we shall consider deep pharyngoscopy in conjunction with œsophagoscopy.

CONTRA INDICATIONS.

Jackson does not impose on himself a long catalogue of contra-indications to deep pharyngoscopy and œsophagoscopy as do many high authorities. Extremes of age are no bar. "While the author would not hesitate to advise œsophagoscopy in a patient with aneurysm or very hard arteries, advanced organic disease, or extensive acute necrotic or corrosive œsophagitis, if there were very urgent necessity for it; yet œsophagoscopy can be indicated in such a case only by very urgent conditions such as the lodgment of a foreign body." Elsewhere Jackson says he would rather not pass an endoscope in the early stages of escharotic pharyngitis and œsophagitis. He admits, however, one absolute, as distinguished from conditional, contra-indication, viz., a state of "water-hunger." "This condition, which makes the patient a very bad surgical subject, does not seem to be recognised by the profession."

We are therefore rather staggered to find that it is Jackson's illogical practice, where the "bad surgical subject" has been "able to get but little liquid down for a number of days," to resort to surgery nevertheless, and "have a gastrostomy done immediately should the patient prove to be in a serious state of water-hunger." "Water is introduced into the circulation by hypodermoclysis and enteroclysis simultaneously" while gastrostomy is being performed! We have met with a number of water-hunger cases, and in no instance have immediate endoscopic procedures resulted in other than good. In a very bad case, however, we should prefer to rely on a saline injection per rectum, and then resort to the œsophagoscope rather than risk an unnecessary gastrostomy. Jackson rightly remarks that, however valuable a rectal saline injection may be for relieving thirst and collapse, "for nutrient purposes rectal administration is dangerously inefficient."

PRELIMINARY USE OF THE THROAT MIRROR.

Before passing an endoscope in suspected œsophageal disease Jackson, of course, insists on the value of the use of the throat mirror in order to be sure that the dysphagia is not really due to obvious disease of the visible part of the pharyngo-laryngeal party-wall or of the pyriform fossæ. Laryngeal paralysis, if present, will be a sign suggestive of malignant disease either low down in the pharynx or high up in the gullet. He alludes to the presence of fluid (though there is no mention of its being frothy) in the pyriform sinuses when the patient is erect. "This condition is known as the author's sign and is *diagnostic* of a high degree of œsophageal stenosis." We were not aware that this was known as Jackson's sign, and it certainly is not of any differential diagnostic value in "œsophageal stenosis if of a severe type," as he frequently alleges, for it is also met with in all cases of severe stenosis of the deep pharynx. It is found, for instance, in cancerous and other forms of tumefaction of the arytenoid regions and of the pyriform fossæ, and in stricture of the hidden post-cricoidal pharynx due to cancer or to escharotic, luetic, and traumatic strictures; also it is seen in pharyngeal diverticula. In fact fluid, and usually frothy, is a very familiar sign of marked obstruction *either* in the lower pharynx *or* in the gullet. Jackson admits that Levy has called his "attention to an exception to the *pathognomony* of this sign in advanced cases of laryngeal tuberculosis." This he explains as the result of avoidance of swallowing due to pain, and possibly also "in some such cases to an *œsophageal* (*sic*) stenosis due to reflex spasm of the crico-pharyngeus." We must add that the quotations cited in this paragraph contain no words in italics in the original.

Wm. Hill,

(To be continued).

CORRESPONDENCE.

November 29, 1915.

To the Editor of THE JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND
OTOLOGY.

DEAR SIR,—After Dr. J. S. Fraser's paper¹ had been read at the discussion on mastoid grafting at the meeting of the Otological Section, I stated that for many years past, in the case of my patients, a slice of skin had been removed from the upper border of the skin flap above the ear to prevent the ear dropping.

In confirmation of this, I am writing to mention that on page 551 of the second edition of my book, published in 1901, the following passage occurs:

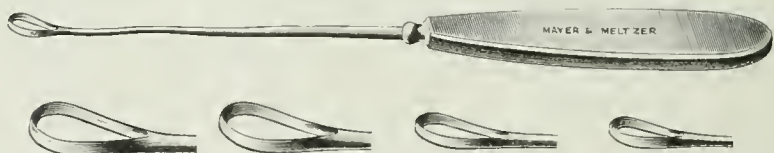
"Unless special precautions are taken, the auricle will slip to a much lower level than its normal position. In order to prevent this, it is well to remove a slice from the upper border of the flap, and then pass some sutures through the flap, and fasten them over drainage-tubing to the skin above the line of the incision."

Yours sincerely,

T. MARK HOWELL.

NEW INSTRUMENT.

THE possible advantages of a malleable over a rigid metal curette in the performance of intra-nasal operations was brought to my mind by the difficulty I often experienced in using the rigid instrument in the more or less inaccessible regions of the nasal cavity and its adnexes. I have accordingly had an instrument made for me by Messrs. Mayer and Meltzer which has a malleable metal shaft four inches in length.



and permits of the curette being turned in any lateral or antero-posterior direction as desired. This instrument, the curette of which is made in four sizes, I have found of great utility in the performance of all intra-nasal sinus operations, and is of special use in the removal of adenoid remains in and about Rosenmüller's fossa by the transnasal route.

Care must be taken to avoid bending the instrument at that place where the rigid curette is joined to the malleable copper shaft.

J. B. HORGAN, M.B.

NOTES AND QUERIES.

We understand that a second edition of Sir StClair Thomson's "Diseases of the Nose and Throat" is in the press. It is headed with the Excelsior motto from Michelet: "*Un livre est toujours un moyen de faire un meilleur livre.*"

¹ See p. 80.

THE
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**PARTIAL RESECTION OR WINDOW RESECTION OF THE
LARYNX FOR INTRINSIC MALIGNANT DISEASE.**

BY H. LAMBERT LACK.

THE aim of an operation for malignant disease of the larynx is to remove the disease thoroughly with the least risk and the best functional result; and every operation must be judged by the facilities it gives for obtaining these three objects. The chief risk at the time of the operation arises from blood entering the wind-pipe and interfering with respiration during the administration of the anæsthetic. The later and more considerable dangers are sepsis and septic pneumonia. They are due either to the inhalation of blood during the operation; or later on to food and fluids from the mouth entering the wound, setting up sepsis in it, and causing profuse septic discharge which runs down the trachea or is sucked into the lungs. Operations on the larynx, more particularly in cases of early epithelioma limited to one vocal cord when the operation known as thyrotomy is possible, give remarkably good results. Yet I believe that this operation may be greatly improved in all cases by the removal of a portion of the laryngeal cartilages. This addition, instead of complicating, greatly simplifies the operation, diminishes its risks, allows a more thorough removal of the disease, and gives as good, if not better, functional results.

The usual operation consists in exposing the cartilages of the larynx and trachea through a vertical incision in the median line of the neck from the hyoid bone to within a finger's breadth of the

sternal notch. A low tracheotomy is performed, a tube inserted, the thyroid cartilage is divided in the median line, and then the soft parts and mucous membrane of the larynx carefully divided through the anterior commissure so as not to injure either vocal cord. The incision may be prolonged upwards across the thyrohyoid membrane and down across the crico-thyroid membrane, even the ring of the cricoid may be divided if the growth extends low down. The interior of the larynx is exposed by pulling apart the halves of the thyroid cartilage with retractors, and through this opening packing is introduced into the upper part of the trachea, to prevent blood entering the lungs during the rest of the operation. The two halves of the larynx being retracted as far as possible, an incision is made above and below the growth, leaving a sufficiently wide margin of healthy tissue, and the soft parts, including the perichondrium, are raised off the inner side of the thyroid cartilage and cut away.

The difficulties of this operation are mainly due to the fact that splitting the thyroid cartilage and pulling aside the two halves with retractors gives a very poor view of the interior of the larynx. When this opening is filled by forceps and cutting instruments their manipulation is very difficult, and if bleeding is at all brisk the difficulty is increased. Constant sponging is necessary, and even then but a brief view can be obtained. There is danger of blood getting past the plug into the trachea and embarrassing the anæsthetic, and a danger of subsequent pneumonia if the anæsthesia is too deep. Through the small opening it is almost impossible to arrest the bleeding with pressure forceps. The difficulty in seeing, in defining the limits of the growth, and in removing it thoroughly and in arresting the hæmorrhage, are increased as the posterior part of the cord is reached and the posterior incisions have to be made. By my method these difficulties are largely overcome.

The steps of the operation may be briefly summarised. The larynx being exposed and tracheotomy performed, the larynx is opened by a median incision, extending from the thyroid notch to the upper border of the cricoid ring, or through the ring if necessary, just as in thyrotomy (see Fig. 1, A B). This incision is deepened carefully in the median line until the interior of the larynx is opened, when retractors are inserted and the two halves of the larynx gently pulled apart. The retraction should be done *gently*, just enough space being obtained to see clearly into the interior of the larynx with reflected light and to ascertain the upper and lower limits of the disease. This opening allows con-

firmation of the diagnosis by direct inspection and also permits examination with the finger if this is desired. This examination concluded, the perichondrium is turned off the ala of the thyroid as far up and as far back as it is desired to remove the cartilage. With cutting pliers or strong scissors transverse incisions are now made, dividing the cartilage and the mucous membrane of the larynx at one cut. These incisions are made as high above and

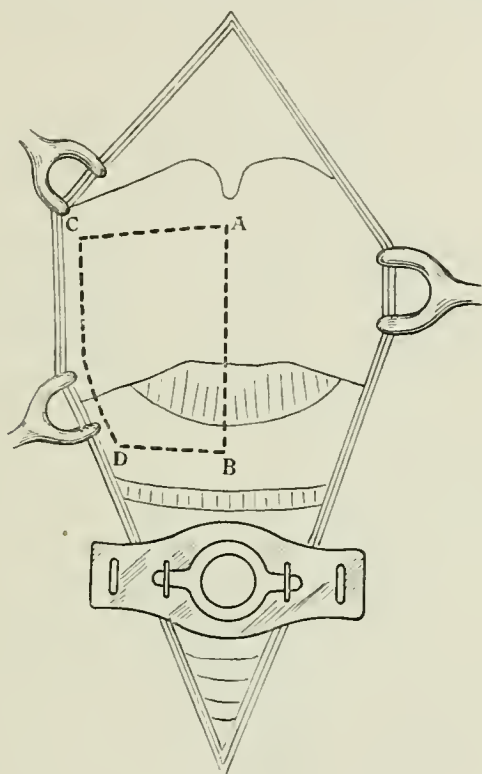


FIG. 1.

as far below the growth as considered necessary, and gradually carried backwards (see Fig. 1, A C and B D).[†] As they are carried backwards, the flap marked out is easily retracted, and permits a good view of the interior of the larynx. The deeper the incisions, the easier the retraction and the better the view. Thus when the posterior end of the cord is reached and the posterior incision has to be made, a very free view is obtainable. The operation is completed by dividing the thyroid cartilage in the line of the posterior incision, and thus removing growth, cord, and underlying cartilage in one piece. If the cartilage is ossified and very

hard or brittle, this transverse posterior cut can be made earlier in the operation. It should be made with a small saw, or by gently sawing with a knife, and the soft parts underlying it should not be cut. This division of the cartilage renders retraction of the flap more easy. All bleeding and oozing being arrested, the perichondrium detached from the removed cartilage is united with one or two sutures to the opposite cartilage, the packing and the tracheotomy tube removed as in the ordinary operation of thyrotomy.

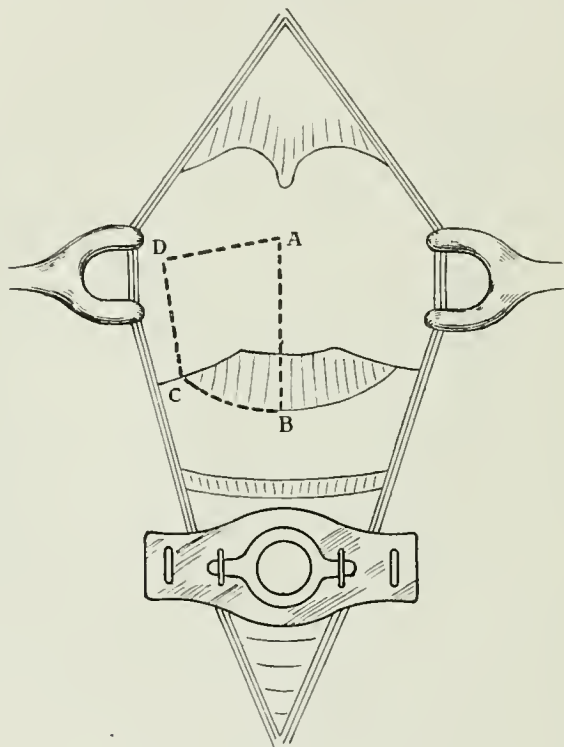


FIG. 2.

The great advantages of this method result from the easy access it provides. Instead of operating through a narrow slit, one has ample room, one can see the limits of the growth and take away exactly as much tissue as one wishes. The operation can be carried out rapidly, it would not be too much to claim that from the time of the tracheotomy being completed the subsequent steps of the operation do not occupy half the usual time required for thyrotomy. All bleeding points may be controlled with pressure forceps in the usual way. These advantages may be summarised.

(1) Thorough removal of the disease is ensured by the free view of the parts which is obtained. The removal of the cartilage underlying the growth makes for additional thoroughness.

(2) The rapidity of the operation and the ease with which the bleeding is controlled diminishes the great danger of the operation, namely, blood entering the air-passages and causing difficulty with the anaesthetic during operation and, subsequently, septic pneumonia.

(3) After the operation the patient is able to swallow perfectly just as after a simple tracheotomy. In the ordinary thyrotomy to obtain sufficient access it is often necessary to divide the thyrohyoid membrane and to pull the two halves of the larynx forcibly apart. After the operation the patient may have difficulty in swallowing. Fluids especially are very apt to enter the air-passages, causing sepsis and septic pneumonia. This is not a necessary consequence of thyrotomy, and certainly does not occur in many cases. Moreover, in some it is slight, and the patient can cough up the few drops which "go the wrong way." In a proportion of cases the difficulty is serious, and tube-feeding for a few days, a week or even ten days, is necessary. In such cases there is always a leakage of saliva into the wound, with consequent sepsis and a danger of septic pneumonia. The patient can also swallow without pain, whilst after thyrotomy there is often considerable pain for some days, due probably to the wrenching apart and bruising of the tissues from the prolonged retraction and sponging of the wound and larynx. This danger and pain are entirely avoided by the method I have described.

(4) Healing is rapid, and there is less apt to be necrosis of the cartilage, as all the cartilage which has been bared of perichondrium has been cut away. In thyrotomy a piece of cartilage from the inner side of which the perichondrium has been stripped is left, and before healing is complete a small sequestrum occasionally forms and comes away.

(5) The after results are excellent, the voice is good and returns even more quickly than after thyrotomy. The return of the voice depends upon the formation of a firm fibrous band to take the place of the removed cord. This band will form much more rapidly from perichondrium and soft tissues than it will from bare cartilage. In fact, after some of my cases of thyrotomy the resulting voice has been disappointing, a large cavity having been left where the soft parts were removed. There seems no danger of stenosis. Thus on every ground this operation seems preferable to a simple thyrotomy.

The operation as above described is suitable for all cases of limited growth upon one vocal cord, but various modifications suggest themselves.

Where the growth is small and known to be limited to the centre of one vocal cord, the operation may be performed as follows: The larynx being exposed and tracheotomy performed, the crico-thyroid membrane and the ala of the thyroid on the

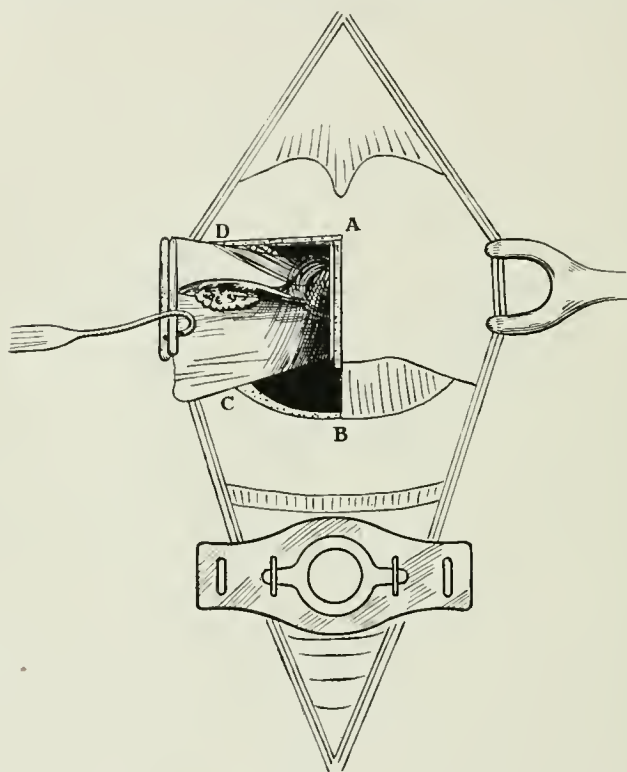


FIG. 3.

affected side are laid bare and the perichondrium dissected off the lower half of the cartilage. A median incision is made through the crico-thyroid membrane and the thyroid cartilage and the underlying soft parts, that is through the anterior commissure, upwards almost, but not quite up to the thyroid notch (see Fig. 2, A B). From either end of this cut two transverse incisions are next made, one from the median line backwards through the crico-thyroid membrane as close to the cricoid cartilage as possible (see Fig. 2, B C), and the other backwards through the ala of the thyroid almost to its posterior edge (see Fig. 2, A D). The quadri-

lateral flap being retracted, a view of the interior of the larynx can be obtained and the exact limits of the growth ascertained (see Fig. 3). These transverse incisions can be carried back as far as considered necessary, and the "window" flap retracted more and more until the posterior incision is made and the growth removed. A full view is obtained of every step of the operation, and any bleeding immediately arrested. In this way the growth attached

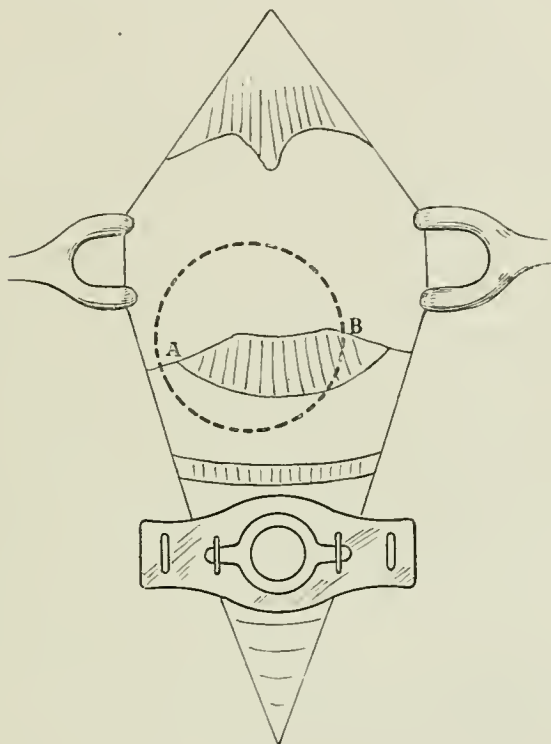


FIG. 4.

to the cord, with a sufficient margin of healthy tissues, and the cartilage underlying it are removed in one piece without doing thyrotomy at all. The remaining steps are the same as above described.

Again, if a growth be situated in the anterior commissure the operation may be performed as follows: Tracheotomy being performed and the larynx thoroughly exposed, a piece of the upper part of the cricoid ring is removed by a semi-circular transverse cut. The larynx is opened by deepening this incision and continuing it through the crico-thyroid membrane (see

Fig. 4, A B). By turning up this flap a peep into the larynx can be obtained and the incision gradually extended upwards and around, but well wide of the growth. In this way the cartilage and soft parts underlying it can be cut across as in the diagram and removed (see Fig. 4). This operation is a little difficult, but has the special advantage that the growth is removed in one piece without cutting into it. There is thus no danger of transplantation of epithelial cells such as must occur in thyrotomy where a median incision is made. The risk of the operation is that if too much cartilage is removed there may be subsequent stenosis of the larynx. Therefore it might be wiser to remove the thyroid cartilage from one side only, viz., that most affected. The operation can easily be arranged for this object. Of course, when a considerable portion of both cords is removed there is always apt to be stenosis in whatever way the operation is performed, and at the same time the voice will be considerably impaired.

It is quite a mistake to state, as some of my critics have done, that this operation is only suitable for cases of very limited growth. The opposite is indeed the truth; the more extensive the growth the greater the advantages of removing the cartilage. The whole of one ala of the thyroid may be removed except the upper and lower border, as Prof. Broeckhaert stated in the discussion at the Laryngological Section, without sacrifice of any of the objects of the operation. When the growth extends low down half the cricoid ring can also be removed.

I have described the operation of partial resection or "window" resection of the larynx as an *alternative* to thyrotomy, but it might in most cases be more accurately described as an *addition* to thyrotomy. The term "thyrotomy" is apparently used in two senses. As applied to an operation for malignant disease of the larynx it is generally used to mean splitting the larynx in the median line, excising a growth and more or less of the soft parts, but not removing any cartilage. Used in this sense the above title is correct. But perhaps the term thyrotomy should really only be applied to the preliminary splitting of the thyroid. In this case "thyrotomy" may be performed as one of the preliminary steps of my operation, just as it is often done in the early stage of total extirpation. Partial resection, or better still "window" resection, would best describe the method I am advocating, whether or not it is preceded by thyrotomy.

For the drawings I am indebted to the kindness of Dr. Norman Patterson.

REMOVAL OF CARCINOMA OF THE HYPOPHARYNX WITH PLASTIC RESTORATION OF THE LUMEN.

BY WM. MOLLISON, F.R.C.S.

CARCINOMA of the hypopharynx occurs as a rule in women, and in comparatively young women, from the ages of thirty-two to forty-five. It is insidious in its onset, and unfortunately cases are seldom seen till the growth is so far advanced as to put operation out of the question. Beginning as an ulcer in the hypopharyngeal wall on the posterior aspect of the cricoid, the growth gradually spreads round the lumen of the gullet. It tends, too, to spread downwards to the œsophagus. When it passes upwards, it arrives above the level of the arytenoids, and then forms a projection, which may attain to a very large size, overhanging the larynx.

The clinical picture is very characteristic. Dysphagia of gradual onset, but progressive; hyper-secretion of saliva which cannot be swallowed and which remains about the upper aperture of the hypopharynx and larynx: this gives to the voice a characteristic thickness. Laryngoscopic examination may reveal this saliva as a frothy mucus, or may show the upper edge of the ulcer pushing its way upwards behind the arytenoids. It is scarcely overstating the case to assert that a thin woman of thirty-five to forty-five who complains of dysphagia and has hyper-secretion of saliva is suffering from carcinoma of the hypopharynx. The final diagnosis is made by direct examination with a Hill's tube in cases of doubt.

The following case is perhaps of interest as being a fairly early one, and one in which operation was possible. The ulcer had not involved the whole lumen, and did not extend for more than $1\frac{1}{2}$ to 2 in. in a vertical direction.

The patient, Rose L——, aged thirty-nine, attended in the Throat and Ear Department at Guy's Hospital complaining of difficulty in swallowing. This symptom had been noticed for four months, and had been increasing, till on admission to the hospital only fluids could be taken slowly and with much difficulty.

The patient was a thin, pale woman with a long neck. Examination with the laryngeal mirror showed frothy mucus about the upper end of the hypopharynx, and on phonation there was revealed the edge of an ulcer. With a Hill's tube this ulcer was seen to occupy almost the whole circumference of the hypopharynx. There was only a narrow strip of normal mucous

membrane on the left posterior wall. Vertically the ulcer extended from the level of the lower part of the arytenoids above to about $\frac{1}{2}$ in. below the level of the cricoid cartilage. There were no glands to be felt in the neck.

Since the ulcer was comparatively small, the patient's neck long and thin, and the general condition of the patient favourable, operation for removal of the growth was decided upon and performed on December 4, 1915.

Dr. Shipway kindly administered ether by intratracheal insufflation. This proved of great assistance, doing away with the necessity of tracheotomy and removing all anxiety as to blood passing into the trachea. The catheter lying in the larynx

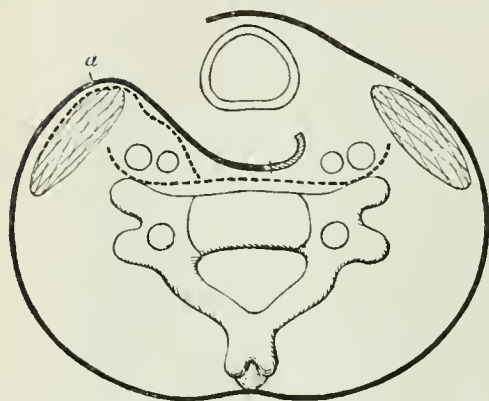


FIG 1.

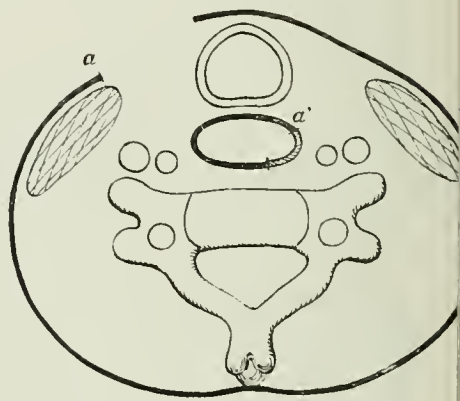


FIG. 2.

in no way interfered with the operation when the pharynx was opened and the growth removed.

The method of approach was that described by Mr. Trotter in his Hunterian Lectures, 1913, and the steps of the operation followed those described by him.

The skin and subcutaneous tissues of the neck were infiltrated with a solution of novocain (0.5 per cent.) and adrenalin, and the anæsthetic was then administered.

(1) An incision was made slightly to the right of the middle line from the level of the hyoid bone to within an inch of the suprasternal notch. From the upper end of this another incision was carried out along the hyoid bone to the anterior border of the sternomastoid. The triangular area of skin with the platysma was reflected outwards, thus exposing the carotid triangle.

(2) The pharynx was separated from the carotid vessels, and the

fascia over the carotid triangle was sutured to the prevertebral fascia.

(3) The great cornu of the hyoid bone and the right ala of the thyroid cartilage were freed from their muscular attachments and from the pharyngeal wall on their deep aspects and removed. The superior laryngeal nerve was seen and easily avoided.

This step gives a very good view of the pharyngeal wall; in this particular case it probably was not necessary to remove the great cornu of the hyoid, as the growth was confined to the post-cricoid region.

(4) The pharyngeal wall was opened (between two stitches) by a vertical incision at the level of the upper part of the thyroid ala; by enlarging this incision the growth was well seen. It was now found that more room was required downwards, and the right lateral lobe of the thyroid body was removed.

(5) The ulcer was excised with a $\frac{1}{4}$ -inch border of apparently normal mucous membrane all round, stripping off the growth from the back of the cricoid. When this was done a strip of mucous membrane only $\frac{1}{8}$ to $\frac{1}{4}$ of an inch wide and 2 inches long was left connecting the pharynx above with the œsophagus below.

(6) The skin flap was now brought forward, and two horizontal incisions were made in such a position that a flap was formed opposite the gap made in the gullet by the removal of the ulcer. The free edge of this flap was now sutured to the posterior edge of the mucous membrane; this flap lay over the carotid triangle.

(7) Lastly, the original incision was sutured as far as possible, and a rubber tube was passed from the mouth to the stomach.

The progress of the case was good; the patient was fed through the tube for about five days; it was then removed and passed into the stomach from the neck wound. To prevent infection of the wound, the dressings were changed several times a day. Except for a little redness of the skin over which the mucus passed, healing took place without incident; the skin-mucous membrane junction was soon perfect. After three weeks the tube was removed, and the patient swallowed fluids and semisolids with comfort by holding a pad over the neck-wound.

On January 23 a further operation was performed in order to complete the lumen of the gullet by turning in the skin-flap.

Mr. Knott administered ether by intratracheal insufflation.

The base of the flap over the sterno-mastoid was divided, and the skin freed for a sufficient distance to allow of the edge being turned forwards and inwards behind the cricoid and fastened to

the anterior edge of the mucous membrane strip; this was done by means of catgut sutures, threaded on cleft palate needles and manipulated by means of a Lane's needleholder. The upper and lower free edges of the skin "tube" were then sutured to the free edges of the pharyngeal wall above and of the œsophagus below, in order to make the junction watertight.

The superficial skin edges were drawn together as well as possible, and the rubber tube once more passed from the mouth through the new gullet to the stomach; it was left in position for three days. On its removal the patient swallowed fluids without any leakage. In a few days semi-solids were allowed, and then solids, till finally the patient was swallowing like a normal person.

REPORTS FOR THE YEAR 1915 FROM THE THROAT AND EAR DEPARTMENT OF THE ROYAL INFIRMARY, EDINBURGH.

Under the care of A. LOGAN TURNER, M.D., F.R.C.S.E, F.R.S.E.

AN INVESTIGATION INTO THE RESULTS OF THE SUB- MUCOUS RESECTION OF THE SEPTUM IN CHILDREN.

BY CHARLES H. HAYTON, F.R.C.S.ED.

Interim. Surgeon for Diseases of Nose, Ear, and Throat, Prince of Wales Hospital, Tottenham, and Queen's Hospital for Children, Hackney; formerly Senior Clinical Assistant, Ear and Throat Department, Royal Infirmary, Edinburgh.

THE advisability of performing a submucous resection upon the nasal septum before the age of puberty, while not contested as keenly as a few years ago, is still a debatable question.

Loeb (1), in 1912, when citing the indications for and the contra-indication against such an operation, stated that it is advisable not to operate upon children and young people under eighteen years of age. Now and again one reads of the same injunction being given in current text-books published upon the nose and throat.

On the other hand, Killian (2) in 1908 had operated upon children from four to eight years of age with good results. Heermann (3) states that the submucous resection of the septum in children, if the deviation be not too extreme, can be performed under local anæsthesia without leading to post-operative disturbances of the growth of the nose. He further states that septal spines should be removed by the submucous resection method and not by the saw. Subsequent experience has shown that such

operations upon children, if performed carefully and judiciously, are productive of excellent results, and that the fear of facial deformity following the operation, while not wholly groundless, has been much over-estimated.

The results of the submucous resection upon children during the seven years from 1908-1914 inclusive, in the Ear and Throat Department of the Royal Infirmary of Edinburgh are found in the following report. The statistics have been compiled from the case-sheets of the patients with the kind permission of Dr. Logan Turner, and also from interviews with and examinations of the patients themselves. All the operations were performed by Dr. Logan Turner or Mr. J. S. Fraser.

The total number of patients operated upon for submucous resection during the seven years above mentioned have been 761. Of this number seventy-three, or 9 per cent., were children whose ages ranged from six to fourteen years. Sixteen, or 21 per cent., of the seventy-three cases were girls. Forty-four, or 60 per cent., gave a definite history of blows or accidents to the nose as the cause of the deformity. The remaining twenty-nine cases had no cause recorded in the notes. It is possible, however, that trauma had been a factor in producing the deflection in many of these cases.

The following table gives the number of children, the age of each, and the year in which the operation was performed:

Age.	Totals.	1908.	1909.	1910.	1911.	1912.	1913.	1914.
6	3	.	.	2	1	.	.	.
7	2	.	.	.	1	1	.	.
8	7	1	.	.	1	3	1	1
9	3	.	.	2	1	.	.	.
10	4	1	.	.	.	1	1	1
11	5	.	.	1	2	1	1	.
12	10	2	1	2	.	.	2	3
13	21	1	1	4	1	4	5	5
14	18	1	2	3	3	6	.	3
Totals	73	6	4	14	10	16	10	13

The operations were all performed under general anaesthesia. Chloroform was used in all the cases till the year 1914. Since then the open ether method has been tried, with varied success. In some cases a mixture of chloroform and ether was given. To the older children atropine, $\frac{1}{120}$ gr., combined with morphia, $\frac{1}{12}$ gr., was administered one half-hour before the operation. In addition

each nostril was packed with gauze steeped in 5 per cent. cocaine, to each drachm of which was added 5 drops of 1 in 1000 adrenalin solution.

The technique of the operation followed along the classical lines of Killian with a few modifications. The incision used was the L-shaped one, with the horizontal limb running along the floor of the nose beneath the crest. The muco-perichondrium was separated on both sides of the deviation, and the thickened portion of the cartilage removed first. Only when this had been accomplished was the separation undertaken of the muco-periosteum from the maxillary crest and the vomer. In this way it was possible to avoid splitting or tearing the muco-perichondrium along the line of the crest on the side of the septal convexity. The upper portion of the quadrilateral cartilage was always left to support the dorsum of the nose. In some cases the anterior end of the cartilage was removed, as it projected into one of the nostrils and gave rise to obstruction. The septum of many of the traumatic cases was very difficult to remove, because the cartilage was often found to be split vertically, so that one had to deal with two pieces separated by fibrous tissue. The mucous membrane in these cases was always adherent and very difficult to detach.

In conducting the investigation into the results obtained, a card was sent to each of the seventy-three patients asking them to call at the infirmary for examination. Thirty-one patients responded to the request. In a number of cases the parents or other relations accompanied the patient, and with their help most satisfactory answers were obtained. The forty-two patients who did not report received a letter in which was enclosed a set of questions to be answered and returned. Twenty-two papers were received completed; fourteen were returned "address unknown"; and the remaining six were never heard from.

The following questions were asked:

(1) In what different ways has the operation benefited the child?

(2) Have there been any falls or blows on the nose since the operation?

(3) Have the patients, parents, or friends noticed any change in the appearance of the nose since the operation?

The examination consisted in noting the following:

(1) The amount of any external deformity.

(2) The patency of both nostrils.

(3) The consistency of the newly formed septum.

(4) Perforations of the septum.

(5) Nasal discharge, crusts, and enlarged turbinates.

With few exceptions, the parents and patients themselves bore unsolicited testimony to the great improvement in nasal breathing and general health which had resulted from the operation.

Three of the mothers said that their boys had formerly been subject to asthmatic attacks, but since the operation these attacks had entirely disappeared. Four others had noticed the relief obtained from constant attacks of colds. Two parents remarked that bronchitis had disappeared since the operation. One mother stated that her boy had been an "habitual sniffer" till the operation, but that the habit had since left him. Another parent said that her boy's deafness had much improved since the operation. Another parent remarked that a watery discharge had completely dried up. "He sleeps better at night now," "He does not have his mouth open so much," and "He breathes through both his nostrils since the operation," were some common statements which were made.

With regard to the falls and blows upon the nose, none remembered having any since the operation.

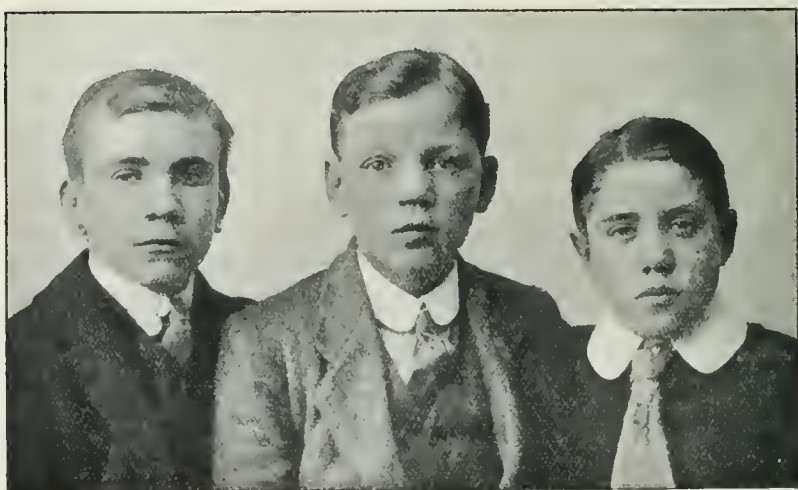
The replies to the question relating to the external appearance of the nose were not so gratifying. Ten patients, and the parents of these as well, 33 per cent. of the thirty-one cases, stated that they had noticed since the operation a broadening of the nose, especially across the alæ. Six of these ten patients noticed that the nose had a tendency to sink in as well. The "sinking in" appeared to take place at the junction of the lower border of the nasal bones and the quadrilateral cartilage. As the patients sat together waiting for the examination one's attention was attracted to this peculiar saddle-back appearance of the nose. A photograph of three of the patients taken at the time accompanies this article.

In order to form an accurate opinion as to whether submucous resection of the deviated portion of the septum really results in deformity, or in increasing an existing deformity, it would be necessary to take photographs of the patients in profile *before as well as after the operation*. At present we have only the statements of the children and their parents to go on. The writer thinks it better in the meantime to publish the paper as it stands, though he hopes on a future occasion to go more scientifically into the question.

In contrast, six, or 20 per cent., of the patients had noticed

that the nose was much straighter since the operation. The remaining fifteen, or 47 per cent., had noticed no difference.

If tabulated the results stand as follows :



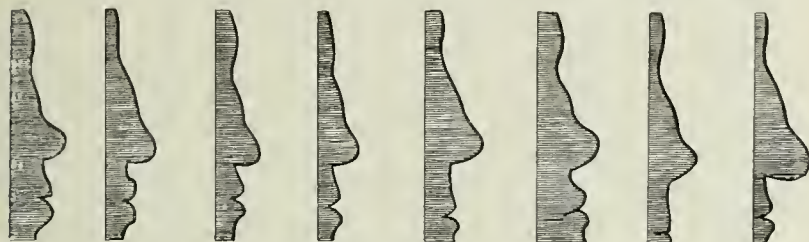
Thirty-three per cent., or ten patients, broadening of nose with saddle-backs (six).

Twenty per cent., or six patients, nose straighter.

Forty-seven, or fifteen patients, no difference.

The examination showed that all the patients could breathe through both nostrils quite freely. Eleven, or 38 per cent., of the septa were not quite in the mesial plane. Six, or 20 per cent.,

showed crust formation. Three seemed to have slight watery discharge. No atrophic conditions were seen. In four of the patients one inferior turbinal was enlarged. Six of the septa moved slightly on forced breathing. All could be moved with the probe, thus showing that the newly formed septum consisted of fibrous tissue. As newly formed fibrous tissue has a great tendency to contract, it is easy to account for the flattening and the dimpling of the nose. *No perforations were discovered in the thirty-one cases examined.* Eight profiles of the nose drawn during the examination are here shown. These illustrate the average anatomical deformities complained of. No photographs of the cases before the operations were taken. By comparison it might be shown that



Profile view of nose.

many of the external defects in the nose existed prior to the operation.

CASES REPORTED BY LETTER ONLY.

Of the forty-two letters sent to the patients twenty-two, or 50 per cent., were returned completed. The questions asked upon the papers were the same as those asked the patients. Seventeen patients, or 77 per cent. (twelve boys and five girls), were reported by their parents to have breathed much more freely since the operation. Four boys did not seem to derive much benefit—in what way was not stated. Eleven boys and three girls reported that they had been free from constant attacks of colds since the operation. One boy and one girl stated that their “runnings” from the nose had ceased. Only one boy reported he had received a blow upon the nose since the operation.

Nine parents, or 40 per cent. (six boys and three girls), reported they had noticed that the noses of their children had become a little flatter than formerly, and five of the same parents said also that the nose seemed more dimpled. Three parents made no reply to this question.

The following letter received from a parent, whose son had been operated upon three years previous, is typical of the statements made:—

“DEAR SIR,—In reply to your inquiry about my son, William, the operation upon his nose has altered his appearance somewhat, the bridge of the nose looks flat, and has fallen in a little.

Yours respectfully.”

On the other hand ten parents, or 44 per cent., eight boys and two girls, reported that they had not noticed any change in the external appearance of their children's noses since the operation.

If tabulated the results of the letters stand as follows:—

Forty per cent., or nine patients, broadening of the nose, with five also flattening.

Forty-four per cent., or ten patients, no change.

Sixteen per cent., or three patients, no reply.

The conclusions one may draw from the foregoing investigation of the thirty-one cases who submitted themselves for examination and the twenty-two papers returned are as follows:

(1) Seventeen of the letters and the thirty-one patients who were interviewed (92 per cent. of the fifty-three cases) bore straightforward testimony to the great benefits derived in regard to the general health and the nasal breathing of the child.

(2) A certain amount of physical deformity appears to have followed the operation in 35 per cent. of the fifty-three cases. No data are, however, available on which to form an opinion as to the amount of the deformity present before operation.

(3) The great benefit derived from the operation as to the health of the child overshadows the slight cosmetic defects that were complained of, especially as these defects could be remedied, if necessary, by paraffin injections.

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SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

December 3, 1915.

President: DR. J. W. BOND.

The Histology of an Angeio-fibroma of the Naso-pharynx and its important Bearing on Operative Procedures.¹—Irwin Moore.—Considerable difference in opinion appears to exist as to the origin and attachments of these growths, the question of a capsule, the position of the blood-vessels and sinuses, and the best method of removal. Further confusion takes place through not differentiating them from fibrous growths originating in the nasal cavities.

The General Structure of these Growths.—They are composed mainly of a dense fibrous tissue, strands of which may be seen spreading out from their basal origin. A longitudinal section microscopically shows these fibres displayed parallel with each other, with a tendency to interlace. Scattered about and embedded between the fibres are a variable number of connective tissue cells, in some parts densely packed.

These growths also contain a large number of thin-walled blood-vessels and large cavernous sinuses.

Seat of Origin.—They arise from a broad base in the thick periosteum covered by mucous membrane which lines the roof of the naso-pharynx, a comparatively narrow and limited area corresponding to the basilar process of the occipital bone and the body of the adjoining sphenoid. They are very firmly attached to both periosteum and bone. For example, in a transverse section through the base of this growth spicules of bone were found attached to the periosteum, which interfered with the cutting of the specimen. As the tumour grows, the base increases in extent and fresh attachments arise, due either to the spreading from the original source or to adventitious attachments being formed as a result of inflammatory action. In cases reported of additional origins—*e.g.*, the margin of the internal pterygoid plate, within the spheno-palatine and spheno-maxillary fossæ—we may conclude that these were extensions from the original growth. Reference to sections through the base of the growth shows the fibrous tissue to be denser there than in other parts, and the naked-eye specimen shows the fibres disposed in lines converging from their basal origin.

The Investing Membrane.—Many authorities describe a "capsule" to these growths. They are covered by an investing membrane, which consists of the mucous membrane lining the vault, sometimes comparatively thick, but more frequently thinned away by the increasing pressure of the growth.

Fig. 4 shows a portion of the free surface of the growth with its investing mucosa attenuated and partially devoid of epithelial cells, but

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxx, pp. 319-399.

nothing which could be correctly described as a capsule; hence this term is misleading and is better not used. A few mucous glands may be seen a short distance below the surface.

The Vascular Supply.—Fig. 4 shows, both superficially and deeply placed, many thin-walled vessels and cavernous spaces. They are lined by a single row of endothelial cells, which are well seen in Figs. 2 and 3. Being devoid of a contractile coat and embedded in the dense fibrous tissue, these vessels do not contract when cut across. In these tumours the central portion of the growth appears to be much more vascular than the peripheral portion, and here the cavernous spaces predominate; hence the risk of dangerous hæmorrhage through cutting into or tearing the body of the tumour, well shown in Fig. 2, which should be compared with Fig. 4. In one section through the base of the growth, the fibrous tissue is denser than elsewhere, and the number of vessels, although they are of considerable size, is relatively smaller.

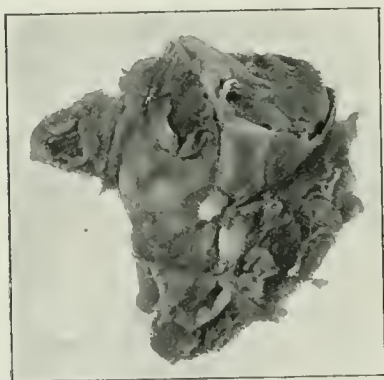


FIG. 1.—Angio-fibroma of the naso-pharynx removed from a boy, aged sixteen. It measured $1\frac{1}{2}$ in. in its longest diameter and $1\frac{1}{4}$ in. in its shortest. The broad basal attachment to the basi-sphenoid and occipital bones is shown, also its prolongation into the left naris.

Here and there a vessel furnished with a muscular wall is encountered. This is of great importance from the operative point of view, and is a guide to the position for attack.

Epistaxis.—When this case was shown on March 5, Dr. Dundas Grant¹ suggested that the growth was not very vascular, since spontaneous epistaxis had not occurred, but though generally considered a characteristic feature of these growths, it certainly does not always happen. In the earlier stages epistaxis is quite unusual. In the case shown by Mr. E. D. D. Davis² epistaxis was absent, as also in Dr. Peters' case,³ shown at the Laryngological Society in 1906, and one reported by Mr. Guthrie.⁴ These were all early cases. When bleeding does occur it is due to surface erosion, owing to the pressure of the growth on its investing mucous membrane. All these points require to be taken

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxx, p. 320.

² *Ibid.*, p. 279.

³ *Vide Proc. Laryng. Soc. Lond.*, 1905-06, xiii, p. 40.

⁴ *Vide Lancet*, 1910, ii, p. 1271.

into consideration in determining the best method for the removal of these highly vascular growths.

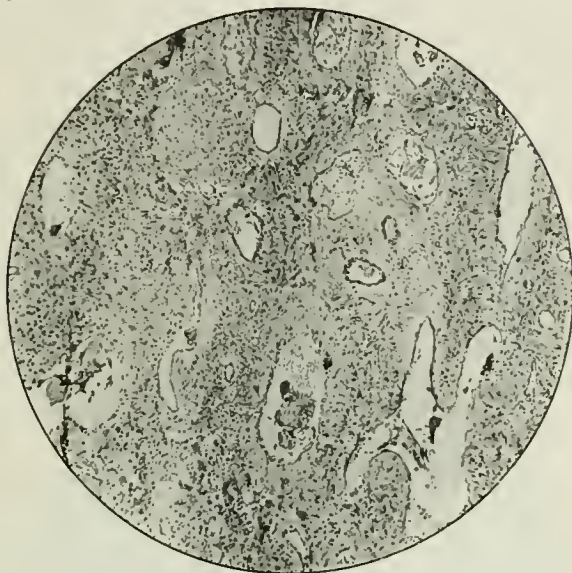


FIG. 2.—Showing the cavernous spaces lined by a single layer of endothelial cells. (Low power.)

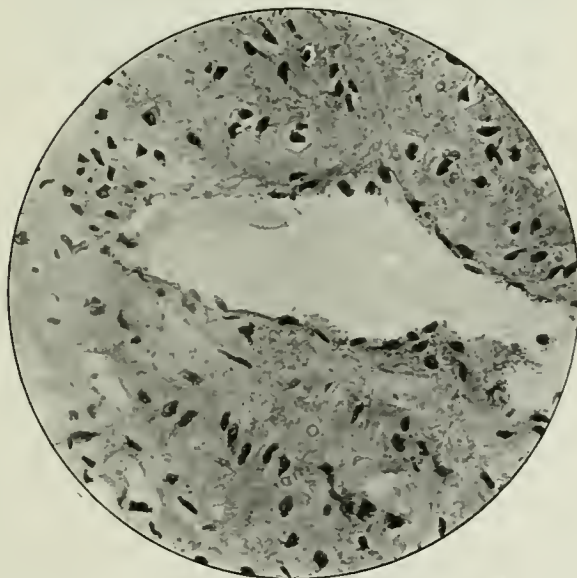


FIG. 3.—Showing one cavernous space of similar structure to those in Fig. 2, highly magnified.

Conclusions.—(1) These tumours should, in my opinion, be approached *viâ* the mouth and naso-pharynx, attacked at their base, and removed

through the mouth. This is the route recommended by Doyen, Moure, Escat, Laurens, Lubet-Barbon, and other French surgeons. There is greater freedom of access by this route than through the nose, and since the prolongations of the growth into the nasal cavities cannot be determined from the front, the separation of the main mass from behind permits these prolongations being more easily followed up and dealt with. With the soft palate tied back by two pieces of thin rubber tubing passed through the nostrils and out at the mouth, it is astonishing the amount of room available—quite as much as that obtained by splitting the soft palate.

(2) The base of the growth and its extensions or adhesions to adjoining parts of the naso-pharynx should be peeled with the periosteum from the bone by means of sharp periosteal elevators, starting



FIG. 4.—Free surface of growth showing some of the investing mucosa (the so-called capsule) and a few mucous glands, lying a short distance below the surface. (Low power.)

posteriorly in close proximity to the growth, and working round and over it as far as the choanal margin from behind forwards and from side to side. In this way the large blood sinuses in the central part of the growth can be avoided. With the patient in the hanging-head position the nasal channels are free to carry off the profuse stream of blood which pours out of the naso-pharynx, and this does away with the necessity for a preliminary tracheotomy or laryngotomy and tampon in the larynx.

(3) The growth should not be seized by forceps until its base has been detached, in order to avoid tearing into its central portion. By means of strong clamp forceps the main mass of the growth is then seized and removed by evulsion, tearing away with it the nasal or other prolongations which extend into the adjoining cavities; these are usually much less firmly attached than the base. If, however, they are too firmly adherent to be torn away, curved periosteal elevators passed

through the mouth into the choanae, or through the anterior nares, may be employed to separate them.

(4) The operation should be performed rapidly and no time lost in trying to staunch the excessive hæmorrhage which invariably occurs, but which ceases spontaneously as soon as the growth and its attachments have been removed. There is no doubt but that there are few of these growths that cannot be reached through the natural passages and extracted with less danger and better results than after extensive and disfiguring operations through the face. Resort to such measures is rarely warranted, and certainly not when the growth is in the earlier stages.

Sir WILLIAM MILLIGAN: I think that Dr. Irwin Moore has indicated a very important point—viz., that these large blood-vessels are held by fibrous tissue, and are therefore unable to retract. In other words, they are canalised, and for that reason I think it is advisable, before operating, to tie the external carotid artery; it makes a good deal of difference in regard to the comfort of the operation, and if it is done immediately before operating there is no time for the setting up of a collateral circulation. I want to ask whether any members of the Section have ever had such an unfortunate accident as I had the other day in dealing with a similar case. I was operating on a boy, aged sixteen, who had a growth as big as that in Dr. Moore's case; I tied the external carotid artery and removed the growth with difficulty. The boy was put back to bed, but in twenty-four hours he became extremely weak and died. We are unable to ascertain any reason for his death; it was not from hæmorrhage, as there was so little of that. It is the only accident I have had in such a case, and I have removed a fair number of such growths. With regard to the capsule, I think the fact that these growths almost invariably recur sooner or later is one of the points which make one conclude there is no real capsule, and the microscopic section shows simply a mucous membrane covering, attenuated in some parts, thickened in other parts. As to situation, my experience has not been that they grow from the basi-sphenoid, but from the lateral wall, at the junction of the posterior and lateral walls of the naso-pharynx, in the region of the Eustachian tube. Very few of these growths are pedunculated; they have broad-based attachments, so that it is very difficult to get anything like a loop of wire round them. Mr. Guthrie a short time ago published a method of dealing with these growths by removing subcutaneously a portion of the nasal process of the superior maxilla, which gives a much better view from the front and more room for working.¹

Dr. DUNDAS GRANT: We are indebted to Dr. Irwin Moore for having shown us so beautifully that the vascularity is chiefly in the interior of these growths rather than at the site of origin. I would recommend very strongly the mode of access to them through the nose, passing a periosteal elevator through the nasal passage. With the finger of the operator in the pharynx, one can attack the base very well, especially if they are attached as much to the inner surface of the internal pterygoid plate as to the basi-sphenoid. And we ought to distinguish these sessile growths from those which have their origin in the antrum of Highmore, and which require an adventitious adhesion and do not grow from the naso-pharynx, though they appear to do so. For the latter cases a different method of treatment has to be carried out—namely, through the

¹ See JOURNAL OF LARYNGOL., RHINOL., AND OTOL., vol. xxx, p. 427.

antrum. They are apt to be lumped together with the others in compiling statistics, and formulating treatment too. It was instructive to hear what Sir William Milligan had to tell us, and it is, perhaps, because so few of us have had any number of such cases that a similar accident has not come before us. One does not know whether delayed chloroform poisoning or some similar coincidental misfortune may have had something to do with the death.

Mr. W. STUART-LOW: I have had a number of these cases which I have shown here, and they were all successful. I lay great stress upon getting the soft palate out of the way; if this is done it facilitates the speed of the operation. This is best carried out by splitting it freely, and then stitching it up after finishing the operation. The easiest and most effective method of controlling the hæmorrhage consists in pushing a sponge-holder carrying a small sponge into each nostril. As the growth is displaced the assistant pushes these sponges into position, and so arrests the bleeding.

Mr. HERBERT TILLEY: I submit that there is no one method we can adopt for the operative treatment of these growths. I am rather tired of referring to the case which I have shown here on more than one occasion, in which, after removal of a very large growth from the postero-lateral portion of the nose, there were three separate recurrences. In that patient I split the soft palate and removed part of the hard palate, so that good access to the growth was obtained. But as it recurred, it was obvious I was not getting to the origin of the growth. Dr. Pegler was present at the final operation, when we opened the maxillary antrum, having removed the ascending process of the maxillary bone, and found the growth very firmly attached to the whole posterior wall of the antrum. It is obvious you cannot remove a growth from that position through the mouth: it must be approached through the face. Hence there are contingencies which necessitate operation through the nose or by a modified Rouze's operation. When the growth springs from the basi-sphenoid, as we used to be taught, one can operate through the mouth by Doyen's method. I do not think these growths spring from the basi-sphenoid as often as from the sphenoid-ethmoidal recess, so they are not, strictly speaking, nasopharyngeal growths, but post-nasal, and should be classed with diseases of the nose rather than with those of the naso-pharynx.

Mr. LAMBERT LACK: There is no one method of dealing with all these cases; they vary so much that one must be prepared to deal with them in different ways. Some can be removed successfully with a thick wire snare, some require a far more severe operation. In one case, in which I used a snare, the patient remained free twelve years, but he has now a recurrence. In another case I performed the Watson-Williams operation, opening the nose from the front, because the growth spread up into the nose, and I think that was the best method of reaching it. At any rate, the operation was done six years ago and the patient remains well. In a number of cases the growths spring from the side of the naso-pharynx, where it is impossible to remove them surgically at all, and in such cases I think we should certainly try radium and X rays.

Mr. E. D. D. DAVIS: I have had four of these cases. In two of them Mr. Waggett and I split the palate, and in two the palate was retracted. The latter two went very much better than the others. In a young subject you get a very good view of the growth by pulling the palate well forward and pushing it up, almost against the roof of the mouth. There were prolongations into the nose. The cases did well, and the sections

show that they were fibromata attached to the posterior wall of the nasopharynx.

The CHAIRMAN (Dr. Donelan) : I think Dr. Irwin Moore is to be congratulated on his demonstration and the discussion which has taken place. We gather from that discussion, as Mr. Tilley has so well pointed out, that each case requires its own special method of treatment.

Dr. IRWIN MOORE (in reply) : In answer to Sir William Milligan, as to tying the external carotid, in looking up the literature in reference to these growths I find a case is reported by an American surgeon in which, though he tied the carotid, the hæmorrhage still continued. With regard to Dr. Guthrie's method, he uses a periosteal elevator through the nose. But I think this is beginning at the wrong end because, if, as in my case, there is a prolongation of the growth along the roof of the nose, this interferes with one getting above the base of the main growth in the post-nasal space. I did not know there was a prolongation into the nose in my case until I had got under the periosteum and stripped the growth off the roof of the post-nasal space, and had grasped the growth with forceps; then I found that it was attached to the sphenothmoidal recess, and I had to separate it by using a periosteal elevator, passed through the front of the nose. If such prolongations cannot be easily torn away along with the main growth after the latter has been detached, they may be loosened in the above manner. I agree with Mr. Tilley that there may be no one method of removal for advanced cases, but in most cases, and especially in the earlier stages, the procedure described above is certainly the best.

Instruments for Laryngo-fissure (Thyrotomy).—Irwin Moore.

—Demonstration of some instruments specially designed and recommended by exhibitor for improving the technique of this operation : (1) Thyrotomy shears; (2) thyrotomy saw; (3) self-retaining laryngeal retractor; (4) intra-laryngeal scissors: (a) straight, (b) curved on the flat, (c) rectangular. The above-named instruments which I have devised for this operation have been for some years in use, though they have not yet been formally introduced to the profession, since it was my desire that they should first stand a fair trial. They are now used and recommended by many of my colleagues.

Thyrotomy Shears.—Designed for splitting the thyroid cartilage in the middle line so as to expose the inside of the larynx. They are very strongly made and are used in the same way as scissors. They will divide the cartilage with one clean cut without causing any crushing or damage, thus avoiding the risk of perichondritis and sepsis. The lower blade has a very fine saw edge, and is curved and pointed to facilitate its introduction through the crico-thyroid membrane under the lower edge of the larynx, and upwards between the vocal cords. The upper blade is provided with a sharp spike at the extremity of its cutting edge in order to transfix the larynx and keep it steady during the cutting. The position of the handles in relation to the blades is such that they are well away from the neck, so that the tracheotomy tube previously inserted in the trachea does not get in the way of the operator's hands.

Experience has proved the great advantage of these cutting shears over any other instrument used for this purpose. They may also be used in the treatment of stenosis of the larynx for the operation of laryngotomy—i. e., laying open the larynx anteriorly and keeping it open for a long period of treatment. In such a case they will divide the cartilage and soft parts, including the skin, at one cut.

Thyrotomy Saw.—This is a small fine saw which is not so cumbersome

as those formerly in use. It is intended for partially sawing the larynx before using the shears in those cases in which the upper and lower edges of the thyroid cartilage are ossified—so frequently met with in elderly people. The depth of the saw-blade is only 4 mm., so that it cannot do any damage to the intra-laryngeal soft parts. The shaft is bent in such a way that when the saw is used by the operator standing above the head of the patient, the patient's chin does not get in the way of the operator's hands. If it is used from below, the operator's hands are well away from the neck and do not come in contact with the tracheotomy tube.

Self-retaining Retractor for Larynx.—This instrument is made on the principle of a nasal retractor. It is useful for separating the lateral halves of the larynx after they have been split open by the shears, and retaining them in any position. With this retractor the larynx may be opened and closed, gradually or quickly, with the greatest facility without overstraining or damaging the cartilage, as may occur with ordinary hand retractors. The retracting hooks may be so adjusted on either side of the retractor that they do not interfere with the dissection of the growth from the inner wall of the larynx. It does away with the necessity of an extra assistant.

Intra-laryngeal Scissors.—(a) Straight. (b) Curved on the flat. (c) Curved at right angles. These have been made with small yet very strong blades and long shafts, which are strengthened to prevent any strain and consequent giving way in the cutting blades. After the perichondrium and soft parts have been raised from the inner wall of the larynx by the periosteal elevator, these scissors are of great service in cutting away the growth along with a portion of the surrounding normal tissue.

The straight scissors, or those curved on the flat are used in making the upper and lower incisions—i. e. above and below the growth, from before backwards.

The rectangular scissors are used to separate the mass posteriorly from the arytenoid cartilage.

Paralysis of Vocal Cord from a Bullet-wound.—**F. A. Rose.**—A soldier wounded at Armentières on October 20. The bullet apparently grazed the left thumb, left side of the chin, entered the neck 1 in. above left margin of sternum, and came to rest in the chest-wall in the neighbourhood of the right third rib, as shown by a skiagram. Surgical emphysema appeared in the right side of the neck and lasted one week; the patient also spat up small quantities of blood for several days. Since admission to St. Bartholomew's Hospital, under Captain Ball, there has been an attack of diaphragmatic pleurisy on the right side. The right vocal cord presents the appearance of abductor paralysis.

Dr. DAN MCKENZIE: Perhaps I may be allowed to mention the sequel of a case I showed at the last meeting, that of a bullet wound of the neck which I thought had gone through the vagus nerve. The patient has since been submitted to operation and the vagus exposed, and it was found that that nerve had not been cut, but it was tightly bound up by adhesions, from which it was released. I have not seen the patient since the operation. Our President expressed the opinion that the vagus had not been cut, his alternative suggestion being that it was bruised.

Dr. D. R. PATERSON: I had under my care a soldier who was injured by the explosion of a shrapnel shell while he was lying in his dug-out. He was awakened by the explosion, and found that his voice had gone.

A spicule of shrapnel had traversed his carotid sheath, the point of entry being almost opposite the thyroid cartilage; one could see the spicule in front of the vertebra. There was complete paralysis of the left recurrent nerve. In Mr. Rose's case there appears to be some slight movement. In our case we did not feel justified in cutting down upon it. The loss of voice followed immediately on the injury.

Sir WILLIAM MILLIGAN: At a previous meeting I showed a skiagram of a bullet embedded in the second cervical vertebra. The only lesion left was recurrent paralysis. The bullet remains in the vertebra to this day. The man is well, except for paralysis of his vocal cord. Something must have happened to the vagus in his case.

Dr. JOBSON HORNE: The man has a remarkably good voice at present. Not a few such cases have come under notice, and the lesson of experience is that so far as surgical exploration is concerned the less that is done the better.

Dr. DUNDAS GRANT: It would be interesting to note whether, and after what interval of time, the right vocal cord passes from the position of abductor paralysis into that of complete paralysis illustrating Semon's law: and whether at that time the voice will again become husky.

Mr. ROSE (in reply): I showed the case because, although we have seen a series in which the left cord has been paralysed by a bullet, this is the only one in which I have seen right-sided paralysis. The patient has several wounds on the left side of the body, he has none on the right side; therefore the bullet must have entered the left side of the body and travelled across the middle line. It is highly probable his trachea was bruised, if not perforated, because surgical emphysema appeared on the right side of the neck, and for several days he spat up blood. The bullet is clearly visible on the right side, in the chest wall, near the third rib.

Unilateral (Left) Paralysis of Soft Palate and Larynx.—Charles A. Parker.—J. D——, aged 27, telegraphist, eighteen months ago noticed his voice was gradually getting weak. Came to Golden Square Throat Hospital in October, 1914, when he was found to be suffering from left unilateral motor paralysis of the soft palate and complete paralysis of left vocal cord. There was no history of any preceding illness. There was some subjective improvement after a course of strychnine. Patient came to the hospital again a fortnight ago as his voice had become hoarse as well as weak. The conditions of left half of palate are just as they were a year ago, the left cord remaining completely paralysed. The hoarseness is accounted for by a tag-like thickening of posterior third of the right vocal cord. Suggestions as to the nature and position of the nerve lesion are invited.

Dr. JOBSON HORNE: I consider that the case calls for a good deal of clinical investigation before an opinion can be usefully expressed. The clinical condition of the soft palate and larynx reminds me of a case of syringomyelia I brought before the Laryngological Society of London in 1897.

Dr. DUNDAS GRANT: There may be an isolated spot of sclerosis at the root of the vagus nerve.

Mr. HERBERT TILLEY: Those who are interested in this class of case will find in the Laryngological Society's *Proceedings* the reports of two similar cases shown by me many years ago. One was that of a man whom we thought had pachymeningitis at the base of skull. He had the left vocal cord, left side of palate, the upper part of the left trapezius and the

left sternomastoid paralysed. It is a class of case of which examples were shown by Sir Morell Mackenzie and Sir George Johnson, and quoted by Sir Felix Semon in one of his monographs on the subject.

Dr. BANKS DAVIS: I showed a case very similar,¹ in which there was paralysis of the left side of the tongue and palate and of the left recurrent laryngeal, and it was regarded as a specific pachymeningitis. As he had difficulty in swallowing, we took him into the hospital. At the *post-mortem* examination we found he had a large cancer at the base of the tongue which he had not complained of during life.

Malignant Disease (?) of the Left Arytæno-epiglottidean Fold and Ventricular Region of the Larynx.—Irwin Moore.—Female, aged thirty-eight. Came to hospital on November 15, complaining of difficulty and pain in swallowing, together with hoarseness of the voice for two months, and feeling as if there were a lump in her throat. For six weeks there has been vomiting immediately after food, and patient has been losing weight. Palpation of larynx causes considerable pain on left side, suggesting perichondritis. No glands in the neck can be felt. No history of syphilis. There is marked œdematous infiltration of the left arytæno-epiglottic fold and ventricular band, together with paresis of the left vocal cord.

Mr. HERBERT TILLEY: I think that the condition is inflammatory, and not a new growth.

Dr. JOBSON HORNE: The clinical appearances do not suggest to me malignant disease of the larynx. Tuberculosis should be completely excluded from the diagnosis in the first place.

Halfpenny impacted for Five Days in the Œsophagus of a Child, aged four.—Irwin Moore.—This case occurred at a general hospital in the suburbs, and illustrates the great advantage of the more modern method of endoscopy over the old coin-catcher. Though the position of the coin was well shown by X rays at the level of the seventh cervical vertebra, all attempts to seize it with the coin-catcher failed, owing to the coin lying against the posterior wall of the œsophagus, and so the instrument missed it by passing up and down in front of it. Five days later the coin was removed without any difficulty through the œsophagoscope. Œsophageal wall undamaged. Patient left hospital next day.

Dr. PATERSON: I had a case in which a halfpenny had been in the œsophagus eighteen months, and it looked as if it had been dug out of some Roman ruin. As in Dr. Moore's case, the child had gone to a general hospital, where it had been submitted to a coin-catcher, and as it failed to bring anything away the child was sent home. After eighteen months there were some tracheal symptoms, and at hospital the coin was discovered. These cases are common now, and I think it is time the authorities at general hospitals recognised that the direct method is the proper one, and that such cases should not be submitted to a coin-catcher.

Sir WILLIAM MILLIGAN: I want simply to remark that I think it is on the posterior wall that these coins always lie. It is right to recognise this, because even with the œsophagus tube it is possible to pass over a halfpenny without knowing it. I associate myself with Dr. Paterson's remark; I think hospitals should give definite instructions to house-

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxix, p. 32.

surgeons not to use the coin-catcher. It is lamentable the state the œsophagus is brought into sometimes by the inexperienced trials at removal of foreign bodies. If these cases were at once sent to the right department, the right method would be used. I have several times seen fatal cases as the result of the wall of the œsophagus being torn by means of coin-catchers. I would suggest that this Section frame a resolution and forward it to the various teaching hospitals in the country.

Mr. HOWARTH: I should like to relate a case illustrating Sir William Milligan's remarks. At a hospital with which I am connected an attempt was made to extract a halfpenny from a child's œsophagus by means of a coin-catcher. The child bit the coin-catcher, broke off the end, and this was swallowed. It became impacted in the pylorus and had to be removed by laparotomy, and the coin, which remained impacted in the œsophagus, was removed by the direct method. Since this occurrence the coin-catcher has been banished from the casualty department at that hospital.

Dr. F. DE HAVILAND HALL: I certainly think some representation on this subject is desirable, but not to a lay committee. I think that if the Section were to draw up a communication and send it to the members of general hospital staffs it would be very desirable indeed. The time has come for pronouncing that the direct method should be employed in these cases, instead of using the coin-catcher.

Tin Disc, 1 $\frac{3}{8}$ in. in Diameter, removed from the Gullet by the Direct Method.—D. R. Paterson.—A lance-corporal, serving in the trenches, found after swallowing a piece of bully beef that the disc usually placed inside the tin had been attached to it and got stuck in his throat. On being admitted to the Third Western General Hospital under exhibitor's care six days later, a skiagram showed the disc opposite the sternal notch. On examining through the œsophagoscope it was noted that the gullet, distended laterally, was sloughing where the edge of the disc impinged on it, and there was a foetid odour. After making out its bearings, a large-sized tube (20 mm.) was passed, and the disc being well exposed was loosened by careful manipulation and drawn up along with the tube. The disc is rather larger than half-a-crown, with its edge turned up at three points.

Large Irregular Piece of Bone, impacted in the œsophagus, removed by Direct Method; Death from Sepsis Six Days later.—D. R. Paterson.—The patient, a short, thick-necked man, aged thirty-five, swallowed a piece of bone in some soup, and was seen some hours later by a doctor, who tried without success to pass a bougie. When seen next day by the exhibitor, inability to swallow was absolute. Direct examination showed the mass opposite the level of the sternal notch with some œdema of the gullet mucosa above it. By passing a 20-mm. tube a good view was obtained of its upper aspect, from which a sharp process impinged into the left side of the gullet. The mass was firmly impacted, and owing to its size and shape ordinary forceps failed to grasp it properly or move it. On the following day, with Irwin Moore's forceps, a good hold and better control was obtained. Careful attention being paid to protecting the mucosa from the sharp projection on the left, steady traction with some lateral movement was made, and the mass was removed without much difficulty. Examination of the parts immediately after showed slight bleeding from the œdematous

mucosa on the right, which had apparently been scored by a ragged edge of the bone. The patient did well until the fourth day, when the temperature went up; there were pain and tenderness on the right side of the neck, and he died two days later, apparently from septic absorption. No autopsy was obtained.

The foreign body—part of a vertebra—has one end smooth and conical, which facilitated entrance into the œsophagus; the other—the upper surface as it lay *in situ*—being oblique with a fractured surface, measures 1 in. (23 mm.) transversely, and $\frac{3}{4}$ in. (17 mm.) antero-posteriorly. The prominent sharp process on the left side was protected during extraction, and it was evidently the sharp right edge, which lay deeper and could not be so well examined, that caused the lesion. Before extraction, the question of œsophagotomy was considered, and it was thought the site of impaction and the short thick neck of the patient precluded it.

Sir STCLAIRE THOMSON: I would like to draw attention to the great danger connected with such septic bodies as pieces of bone in the œsophagus; they are much more dangerous than such articles as tin discs or halfpennies. I have removed from a gullet a denture which had been there two and a half years, and had not led to any septic trouble, and not long ago I removed a piece of hare-bone (from hare soup, a highly septic concoction) which had been in a man's bronchus six to eight months. But when septic bodies are in the œsophagus, and even when removed with all the art of which we know Dr. Paterson is capable, still extraction is a very dangerous proceeding, and we should be careful about our prognosis.

Dr. DAN MCKENZIE: I think that the matter of sepsis in Dr. Paterson's case raises a very important question indeed, and that is whether it is possible to know when it is better to perform an external operation on those cases rather than attempt removal by internal manipulations, even through the endoscope; because in a case of this description only external operation would give the patient a chance. Having seen the foreign body, I consider it is remarkable that Dr. Paterson should have succeeded in getting it out at all. It is wedge-shaped, angular, and the cedematous mucous membrane had lapped over the sharp edges of the base of the wedge as it lay point downwards in the œsophagus. Here an external operation might have given the man more chance. Of course, it would often be impossible to determine when external operation should be preferred.

Dr. HILL: It may perhaps be suspected that the employment of an endoscope of so large a diameter as 20 mm. has something to do with the fatal result in one of Dr. Paterson's cases. I do not think that is so, however, as I have for many years consistently employed œsophagoscopes of 18 mm. and 20 mm. diameter without any evidence of harm resulting. I was led to adopt tubes of large calibre after Dr. Paterson had reported a case of a large bone in the gullet, which he only succeeded in removing after improvising an endoscope out of a bicycle frame tube 20 mm. in diameter. Chevalier Jackson's largest œsophagoscopic tube is 10 mm., and Killian's tubes and also v. Brünig's outside tubes do not exceed 13 mm. in diameter. In my experience, however, the use of the large-calibre tubes introduced by Dr. Paterson greatly facilitates endoscopic procedures for diagnosis—and, of course, more especially in treatment—and mark a great advance in technique.

Major KENT HUGHES: I had a case in which a halfpenny was swallowed by a child five months before, and the patient was brought to a children's

hospital on account of broncho-pneumonia. There was a history that something had been swallowed, and the X rays showed a halfpenny in the posterior mediastinum, and it had ulcerated through the right posterior wall of the œsophagus. We managed to remove it by cutting away a part of the clavicle and two ribs. The child died of broncho-pneumonia. With regard to external operation for removal of a foreign body in the œsophagus, I have done œsophagotomy for such a case once, and I do not want to do it again. It was the case of a man who swallowed an upper metallic denture. It lodged 2 in. below the sternal notch, and nothing I did made any impression up or down. I did not like to do much to it, as it was so tightly impacted. I did a low œsophagotomy and with great difficulty removed the denture with a strong pair of Spencer-Wells forceps. If anyone does this operation, I advise him at the same time to remove the jugular vein. This man went on well for two days, and then ate quickly an unripe pear which the occupant of another bed had given him while the nurse's back was turned. His œsophageal wound was split, and I had to cut through the lower end of the sternomastoid muscle so as to get better drainage. The jugular vein ulcerated, and whilst the house-surgeon was dressing him there was violent hæmorrhage, which was controlled by a double ligature round both vessels. In view of the fact that one so often gets sepsis following œsophagotomy, I should now remove the internal jugular vein at the outset.

MR. LAMBERT LACK: I do not know whether members will approve of a procedure I once adopted. To avoid œsophagotomy, I pushed the foreign body—a large tooth-plate—into the stomach, and left the surgeon to deal with it by that route, a much simpler and safer procedure than œsophagotomy. Some foreign bodies which will not come up can be pushed down easily.

DR. IRWIN MOORE: I should like to congratulate Dr. Paterson on so successfully removing the tin disc by means of an œsophagoscope tube. At our meeting on February 5, 1915, Mr. Whale reported a similar case—a piece of tin with the same measurements, *i. e.* 1½ in. diameter—which he was obliged to remove by œsophagotomy. I think the question of using bigger tubes is a very important one, for it would appear that the lumen of the œsophagus is much larger and more distensible than we are accustomed to think it is, and it is evident that we can safely use much larger tubes for the removal of foreign bodies.

MR. E. D. D. DAVIS: I had, last week, a case in which a hare-bone was impacted. When I removed it by the œsophagoscope it was surrounded by an abscess. The patient, a lady, aged forty-eight, died suddenly forty-eight hours later of mediastinitis and a double pleural effusion; the pus had tracked downwards between the anterior wall of the œsophagus and the trachea, and led to the fatal result.

DR. PATERSON (in reply): I brought this case forward to call attention to the great advantage of these very large tubes. As Dr. Hill has said, I have used them for many years, and I have not noticed any difficulty or after-trouble. I do not think the large tube was responsible for the fatal result. I think it was due to some tearing of the œsophagus during the extraction of the bone. Those who have seen the foreign body will realize the difficulties which were met with. The question of an external operation is very important, and was carefully considered at the time. The man had a very short, thick neck, and the foreign body being down at the sternal notch, it meant our going into the mediastinum, and the chance of successful œsophagotomy was very small. The direct

method was preferred. The difficulty of extraction was not very great, and such a result was very disappointing, because he went on very comfortably for four days, and then suddenly the septic condition occurred. If there had been any warning of this onset naturally one would have opened the part. I particularly recommend the large tube.

Laryngeal Case for Diagnosis.—Irwin Moore.—Male, aged fifty-three, complaining of hoarseness for one month, gradually getting worse. History of syphilis twenty-seven years ago. The right vocal cord is thickened, œdematous, and restricted in its movements. There is also some infiltration on the inner surface of the right arytenoid.

Dr. JOHNSON HORNE: I assume that the all-important point to be eliminated in this case is the presence of malignant disease of the larynx. Personally I can see no evidence of malignant disease.

Case for Diagnosis. ? Chancre of Lip.—Irwin Moore.—Male, aged twenty-seven, complains that he has suffered from swollen glands, both sides of neck, for one month. He has been unable to swallow solid food for three days, and can only take liquid food with considerable pain.

Major KENT HUGHES: I think that the lesion on the inside of the lower lip is undoubtedly a primary chancre. There is, in addition, a faint rash on the skin, and the very large glands are almost diagnostic of a primary syphilitic infection in the neighbourhood.

Dr. JOHNSON HORNE: I agree with the diagnosis; so far as one can judge in the artificial light, there appears to be a secondary eruption on the face. On palpation neither the sore on the lip nor the corresponding gland at the angle of the jaw yields the same induration as in similar cases I have examined. The glandular condition is dominated in this case by the extensive tonsillar involvement.

Dr. BANKS DAVIS: I have seen a good number of cases of the kind, and I think that if the chancre is at the junction of mucous membrane and external skin of the lip there will be an enormous collar of glands, so that the case may be mistaken for mumps. If it is on the inner side—*i.e.*, mucous membrane—there will not be the same glandular involvement, and the glands will be soft.

Chronic Dacryocystitis cured by West's Intra-nasal Operation after Failure by External Operation.—Herbert Tilley.—Mrs. E— was operated on by the external method by an ophthalmic surgeon three and a half years ago for chronic suppuration in the right lacrymal sac. A suppurating external fistula remained. On July 27, 1915, I performed West's operation, and last week received a letter from the patient saying "I am better than I have been for six years."

(By West's operation is understood the exposure of the lacrymal sac in the nose, and the removal of the greater portion of its inner wall; in the large majority of cases the stricture is at the junction of the sac with the lacrymal canal, and hence the operation provides permanent drainage into the nasal cavity above the stricture.)

Dr. DUNDAS GRANT: It is an admirable result, and I should like to ask whether Mr. Tilley has any information as to what the external operation was, whether it was complete excision of the sac or possibly an imperfect one.

Mr. HOWARTH: I have operated upon about a dozen such cases, and the result is extremely satisfactory. Ophthalmic surgeons say that some-

times after these operations you still get a mucocele and some discharge through the canaliculus, owing to the lower part of the sac being left and bulging down. This can be overcome by taking away the upper part of the duct as well as the sac, and I do that in my cases now. I have had no untoward results, and certainly the cases have done well.

Dr. PATERSON: In two cases I have had there has been some closure of the opening after the operation. Both of them were cases of syphilis, and I think it well definitely to ascertain whether syphilis is present in such cases, and, if so, to make a large opening. In both my syphilitic cases, which closed afterwards, I made a much larger opening. I used the small punch-forceps which Dr. Watson-Williams employs for enlarging the entrance to the fronto-nasal duct. Another difficulty I have met with occurred also in a syphilitic case, in which considerable retraction and bony change had taken place. The position of the sac is sometimes determined, and one can combine it with Toti's operation; I have done it in two cases, with very satisfactory results. Another instance where I had the same difficulty occurred in a man who had a very severe injury, his face being driven in, and so the position of the sac was very difficult to determine. We started inside, and found the bone was so thick, and it was so indefinite, that we did an external operation at the same time, and by combining them we secured a very good result.

Dr. JOBSON HORNE: It is interesting to note how long it takes for a scientific suggestion to become generally known and adopted. Speaking from memory, I think I am right in stating that as far back as the eighteenth century an English surgeon pointed out that dacryocystitis could be successfully treated by an operation performed through the nose.

Major KENT HUGHES: In former years I did a good deal of eye work, because in Melbourne specialities are not so sharply divided as here. Some of the failures of West's operation may be due to the fact that ophthalmic surgeons make false passages in these cases more often than they know. I say this advisedly, because for several years I have tried to cure this condition by making a new mucus-lined tube for the lacrymal duct, dissecting the whole sac and duct out. I placed a hollow tube surrounded with mucous membrane in the lacrymal groove. It answers very well at the time, but it is difficult to get enough tissue there to prevent subsequent contraction. I suggest that when the rhinologist fails in curing the lacrymation it may be due to the fact that there are two or three false passages in the upper part of the tract.

Mr. TILLEY (in reply): I was asked, in the other room, "How do you know exactly where the sac is when you look up the nose?" There is an easy way of finding it, namely, to take a pair of forceps with biting edges, such as we use in detaching the tissues covering the capsule of the tonsil. Pass one arm of the forceps outside the nose till the end rests on the lacrymal sac; the other arm is passed up within the nose and, by pressing it towards the outer arm, a small blood spot can be made which will reveal the situation of the sac inside the nasal cavity.

Microscopic Specimen of Recurrent Epithelioma removed from the remains of the Right Ventricular Band of a Patient who had been Operated upon for Epithelioma of the Right Vocal Cord Nine Years ago.—Herbert Tilley.—A male, aged seventy-one, underwent thyro-chondrotomy in May, 1906, and until the last four months he had no laryngeal symptoms. He then noticed an alteration in his voice, it became more gruff and his throat ached after much talking. Having

seen him every six months since the operation, I was surprised in October to notice a localised swelling in the anterior half of the laryngeal mucous membrane corresponding to the situation of the right ventricular band (removed at original operation). This increased in the course of three weeks, and when examined on November 7 the appearance was that of a greyish-pink, localised, slightly nodulated swelling about the size of a pea. I opened the larynx again on November 18, and found the nodule suspicious in its appearance, but soft to the feel. Fearing it was a recurrence of the old trouble, I removed all the soft tissues which covered the internal aspect of the right thyroid cartilage. The patient made a rapid recovery, his temperature not having risen above normal when he left the home ten days after operation.

The case is recorded because of the anxiety caused to both the patient and myself by the rapid development of symptoms and pathological appearances in the situation of a former operation for squamous epithelioma.

Dr. Teale cut sections of the nodule and reported that it was definitely epithelioma. So it is a recurrence nine years after the primary operation. It is somewhat remarkable that amongst my operations for malignant disease of the vocal cord by thyro-fissure, I am able to record recurrences five, six, seven, nine, thirteen, and fifteen years after the primary operation.

Carcinoma of the Superior Maxilla with Secondary Glands in the Neck; Operation; no Recurrence after Two Years.—W. M. Mollison.—Female, aged forty-five, was shown at a meeting of the Section in May, 1914, after operation for carcinoma of the left maxillary antrum and removal of malignant glands in the neck in January, 1914. Now, nearly two years after operation, she remains free from recurrence.

Sarcoma of the Ethmoid; Operation.—W. M. Mollison.—N. R.—, female, aged twenty, was seen at Guy's Hospital in February, 1915, on account of pain about the right eye and swelling in the region of the nasal process of the right maxilla. She had some right-sided nasal obstruction. Examination of a piece of tissue from the ethmoidal region showed the case to be one of sarcoma. Operation was performed through Moure's incision, and the nasal process of the maxilla removed and the ethmoidal cells opened; these were found to be filled with soft growth, and finger-like processes projected downwards and hung into the antrum; the origin of the growth appeared to be from the lining of ethmoidal cells. The whole growth came away easily and seemed almost to be encapsulated. There is as yet no sign of recurrence, and the patient feels perfectly well.

Mr. HOWARTH: Sarcomata of the ethmoid are often very amenable to surgical treatment, as they appear to be of only a low degree of malignancy, and that delays any recurrence. Moure's operation is in most cases an excellent procedure; it gives admirable access to these tumours of the ethmoid, and one can often remove the whole growth and much of the surrounding tissue in a case that does not look by any means hopeful.

Dr. DAN MCKENZIE: If these cases are watched afterwards, sometimes one can see the first sign of recurrence, and if the cautery is then applied it will stop the progress of the disease.

Sarcoma of the Tonsil (?) ; Mass of Glands in Neck ; Removal of Tonsil.—**W. M. Mollison.**—Male, aged thirty-seven, complained of enlargement of the glands in the right side of the neck, extending as high as the parotid region, also an enlarged tonsil. On examination, the right tonsil was seen to be much enlarged, but normal in shape and consistency. The glands in the neck appeared to be discrete and fairly soft ; glands were also felt in both epitrochlear regions, in the axillæ, and in the inguinal regions. A blood-count kindly carried out by Dr. P. P. Laidlaw showed the following : Red cells, 5,700,000 per cubic millimetre ; hæmoglobin, 100 per cent. ; white cells, 8400 per cubic millimetre ; polymorphonuclears, 63·6 per cent. ; eosinophiles, 7·3 per cent. ; lymphocytes, 19 per cent. ; large hyaline, 10 per cent. No abnormalities among the red cells. This result did not suggest a general blood disease. The right tonsil was therefore enucleated, under intratracheal insufflation of ether, and an epitrochlear gland removal.

The tonsil is shown, also microscopical sections of the tonsil and of the gland, and these show chronic inflammatory changes only.

Mr. MOLLISON (in reply to a remark by a Member) : I would like to mention the enormous help one gets in these cases from intratracheal insufflation of ether. There is no comparison between that and the ordinary chloroform inhalation method. Microscopical section of the trochlear gland and tonsil shows neither sarcoma nor Hodgkin's disease, as suggested, but an inflammatory condition. The question came up in this case whether his occupation as a munition worker was in any way the cause of his condition. I do not think so.

Exostosis from the Frontal Sinuses and Ethmoidal Cells.—**H. Lambert Lack.**—(i) This large exostosis occupied the whole of the inner end of the left frontal sinus and extended backwards almost horizontally through the ethmoidal region towards the sphenoidal sinus. It was discovered on operation. The patient had a small sinus over the centre of the upper eyelid which led directly to bare bone. I regarded this as a suppurating frontal sinus which had opened itself, although the nose appeared normal and there was no history of nasal trouble. The frontal sinus was exposed through the usual incision and an attempt made to open it over its inner end. In this region nothing but dense bone was encountered, and it looked as though no frontal sinus was present. By chiselling over the outer half of the orbit, however, a fair-sized cavity was opened, which seemed to be a displaced frontal sinus. It contained pus and the mucous membrane was thickened. The walls of the cavity were entirely removed, and the operation completed by removing the whole of the lining membrane and enlarging the infundibulum. The bony mass of the inner half of the sinus was now examined thoroughly, and seemed to be growing from the posterior wall of the sinus. It filled the sinus so tightly that not even the finest probe could anywhere be inserted between the growth and the anterior or posterior walls of the sinus. The nasal bones were cut away until the growth was exposed, and it was then found to be loose and easily extracted, leaving a huge cavity. When this had been done and the cavity freely opened into the nose it was found that the sinus septum was perforated and the opposite frontal sinus was full of pus. This sinus was also dealt with by obliteration in the usual way. The patient made an uninterrupted recovery.

(ii) This exostosis was removed some years ago. Half the growth projected into the orbit and two or three attempts had been made to

remove it. On exposing the growth thoroughly by a curved incision round the inner angle of the orbit the growth was seen to pass through the inner wall of the orbit into the ethmoidal region. The inner wall of the orbit was accordingly chiselled away until the growth became loose, when it was easily extracted, leaving a large perforation into the nose. This patient also made a rapid recovery.

Tracheitis Sicca in a Boy.—**H. Lambert Lack.**—This patient, a Hebrew boy, aged seven, was sent to me two months ago with marked stridor and considerable dyspnœa of five weeks' duration, for which no cause could be found. On examination I found the trachea obstructed by a mass of large black crusts which seemed almost to fill the lumen. The boy was treated with steam inhalations and a "bronchitis kettle" with no effect. Many days he was kept in bed, and some days he had marked dyspnœa and, according to the parents' account, became cyanosed. I then put him in a nursing home, had his nose syringed twice daily, the throat sprayed three times a day with a Seigle's steam spray, and gave him small doses of potassium iodide. Under this treatment he has greatly improved. There is no stridor nor dyspnœa, but there are still crusts to be seen in the trachea. At no time has the larynx been affected, the voice has always been good, there are no crusts in the pharynx. The nose is rather wide, with a tendency to dryness.

Dr. F. DE HAVILLAND HALL: I would point out the difficulty which sometimes arises in the diagnosis of these cases. Some years ago I was called in to see a patient in consultation, a man, aged about thirty-five, who was suffering from urgent dyspnœa and was very restless. There was very little air entry, and he had marked tracheal stridor. On examining his larynx as well as his restlessness would allow, I found the vocal cords were much congested, but moving freely. I could not get a view of the interior of the trachea. The voice was fairly clear. The urgent symptoms were dyspnœa and some cyanosis. I am bound to say that for some minutes I was staggered for a diagnosis; he had been like that for three days, and I could not find a cause of direct pressure on the trachea. It was only afterwards I thought he had some rhinitis sicca, which led me to expect the possibility of extension to the trachea. He was taken into hospital, and there under warm alkaline sprays and iodide of potassium and chloride of ammonium internally, he brought up in two or three days an enormous mass of thick inspissated secretion from the trachea. When I saw him he seemed to be in imminent peril of death. Cases of this kind should be reported, because there is sometimes so little to be seen.

Dr. H. J. BANKS DAVIS: I suggest the application of paroleine and menthol with a laryngeal syringe.

Mr. LAMBERT LACK (in reply): I brought the case forward to ask about treatment. The treatment which Dr. Hall has mentioned has been carried out with the exception of giving ammonium chloride, but it has not cured him; he still has crusts, but has lost his dyspnœa. I have had one case which died in almost exactly the same circumstances as Dr. Hall has described. I have seen others, but not another fatal case. The cause of this affection is doubtful; in most cases there has been very little wrong with the nose. In some cases alcoholism seemed probable.

Papilloma of Larynx in a Child treated under Suspension Laryngoscopy.—**Dan McKenzie.**—The patient, a boy, aged seven, had

papillomata removed on several occasions in the usual manner, but always with recurrence, so Albrecht's plan¹ of suspension and curetting was tried. The individual papillomata having been removed, their bases were curetted. The operation took place a year ago, and there had been no further recurrence so far.

Mr. E. D. D. DAVIS: I have done four of these cases recently, and I used a very fine cautery after removing the papillomata with Paterson's forceps, with good results in children. This has been done two or three times, and I have had neither trouble nor recurrence. It has been carefully done under direct vision, and there has been no scarring.

Dr. DAN McKENZIE: I should be extremely cautious in applying the cautery to the larynx of a child; first, because of the reaction, and secondly, because of the risk of adhesions and contraction. If a simpler method, such as curetting, is used, the result is as good and it is freer from risk; this method has been carried out in many cases with success.

Dr. JOBSON HORNE: I have used the galvano-cautery in the treatment of papillomata of the larynx in a child, aged twelve months, and with satisfactory results.

Long-continued Spasm of the Œsophagus.—Dan McKenzie.—

The patient, a man, aged twenty-seven, came to hospital about a year ago complaining of obstruction in the gullet of fifteen years' duration. According to the patient's story the swallowing both of liquids and of solids (or semi-solids) had long been a matter of great difficulty with him. Whatever he took seemed to lodge in his chest, and on most occasions was regurgitated into the mouth and swallowed again. The manœuvres necessary to circumvent the obstacle occupied so much time that it was by no means unusual for him to give up a meal in despair. Indeed, when he was first brought to us by Dr. T. B. Jobson, one of our registrars, he was living entirely upon liquids.

The X-ray picture shows general dilatation of the œsophagus above the cardia, but the screen showed two points at which the bismuth meal was arrested.

By endoscopic examination, the only obstruction found was at, or about, the cardia, where the lumen of the gullet seemed to be sharply crescentic, with the convexity forward. A solid bougie was easily passed under inspection; and, beginning with a medium size, we have gradually worked up to the full size, which, once inserted, is allowed to remain *in situ* for periods of an hour at a time.

The result of the treatment has been encouraging. The patient is able to eat, if not a quick lunch, at all events with some hope of filling his stomach, and his weight has increased by 1 st. in the last two or three months. He is not quite well yet, but we are hoping eventually to obtain a permanent success.

I could see no sign of any ulceration or other disease of the mucous lining, consequently it may be tentatively regarded as a case of spasmodic stricture—what Dr. Hertz has called "achalasia of the cardia." One can now insert the œsophagoscope through the cardiac orifice into the stomach.

Dr. F. DE HAVILLAND HALL: I have had two cases of long-continued spasm of the œsophagus, both of them in medical men, aged forty-three and thirty-five respectively, and both addicted to morphia. In one, the

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxix, p. 71.

spasm lasted eighteen months; it came on soon after he discontinued the morphia; but, persevering, he recovered fair swallowing power. He again took to morphia, and on discontinuing it he had a recurrence of the spasm. When I saw him he was very much emaciated, and could swallow nothing but milk, and had some difficulty in taking even that. Yet a large-sized bougie passed easily into his stomach. By persevering and keeping him off morphia, he made a good recovery. That was twenty years ago, and when I saw him two or three years ago he was in very fair condition. The other patient, aged thirty-five, also easily allowed the passage of a bougie, yet next day the difficulty in swallowing was as pronounced as ever. This lasted two or three years to my knowledge, and then I lost sight of him. I have wondered whether there are other similar instances on record. The morphia was not taken for the spasm. One of the patients had been my clinical clerk at a hospital, and when I called in to see him he was suffering from acute tonsillitis, and was in great agony. I injected morphia, and he attributed his habit to the delightful sensation so caused.

Mr. MOLLISON: I have recently seen a curious case somewhat similar to this, in a man aged about thirty-eight. He was admitted to hospital because of his total inability to swallow. We examined him by the direct method, but found no ulceration or obstruction. Next day he swallowed well, and could swallow full diet. But he came up again in five weeks' time, the doctor saying he was excessively ill; he had become thin and wasted, so that he could scarcely walk into the ward. Again we passed a tube, but found nothing wrong, and this time I left a gastric tube in place for forty-eight hours, and he was fed through it. At the end of that time he swallowed a full meal again, and went out well. Thinking he might be a case of achalasia, I tried passing a mercury-filled rubber tube, but it would not go through the cardia. He may yet develop signs of malignant growth.

Mr. E. D. D. DAVIS: I have seen a *post-mortem* of an apparently similar case, in which gastro-enterostomy had been done for persistent vomiting. A dilated œsophagus was found and one could get the thumb through the cardiac end. There was no stricture, no mediastinitis, and no œsophageal obstruction.

Major KENT HUGHES: A near relative of mine suffered from this condition for many years, but is practically well now. Still, whenever she does too much, or is very tired, the condition recurs. Probably it has to do with exhaustion of the longitudinal fibres, as Dr. Hertz has pointed out. Was there, in this case, a difference between the ability to swallow hot liquids and cold liquids? In the case I speak of, the patient could take warm liquids, but not cold ones.

Dr. DAN MCKENZIE (in reply): The points about morphia and tiredness are exceedingly interesting from a physiological point of view. When the vagi are simulated the œsophagus contracts and the cardia opens; and when the vagi are paralysed the œsophagus dilates and the cardia closes. That would explain cases which were worse during tiredness, and might explain the cases in which morphia-taking seemed to be the cause. My patient has had obstruction since the age of twelve. Several months ago Mr. Hope showed a case in which a similar spasmodic contraction of the œsophagus was found in a child, and it was cured by the passage of bougies.

Child with Enlargement of External Nose.—William Hill.—Girl aged eight, whose nose has been getting very large for nine months,

with rapid increase during the last three months. The bones, as well as the soft parts, are involved in the uniform enlargement, which now amounts to a deformity. No suggestion of an angiomaticous, lipomatous, or other obvious lesion. History of maggots in nose one year ago.

Mr. WHALE: I saw the case a year or more ago, when the mother said maggots were coming out of the nose. I gave an anæsthetic, expecting to find a bead or insect there, but found nothing amiss. I am sure that at that time there was no enlargement of the nose; this must have occurred since.

Pharyngo-laryngeal Carcinoma.—William Hill.—Male, aged forty-nine, with epithelioma of the pharyngo-laryngeal party wall, fullness of the right pyriform fossa, and a secondary mass in the right side of the neck. Shown to elicit opinions as to whether the condition is within the limits of radical operative removal.

[Members were agreed that the disease was too advanced for any but palliative measures—*e. g.*, radium or diathermy.]

Epithelioma of Epiglottis.—William Hill.—This man was exhibited at the Section in March, 1914. The epiglottis was subsequently removed through a large endoscope as thoroughly as possible. The case is now shown to demonstrate the excellent palliative result obtained, although there are now signs of recrudescence of the growth, which had been microscopically proved to be an epithelioma.

Ulceration of Pharynx.—George W. Badgerow.—Mrs. O——, sent to me at the Throat Hospital, Golden Square, in June, 1915. She complained of pain on swallowing. On examination, a white membrane was noticed on the pharyngeal wall and epiglottis; on removal of the membrane the surface was very red and bleeding. On the epiglottis ulceration was noticed in places. The condition remains the same; it does not seem to get worse or better.

Mr. TILLEY: I should not be surprised if the appearances were found to be of factitious origin.

Dr. JOBSON HORNE: If the condition in the pharynx and right ary-epiglottic fold be due to disease, then, in my opinion, the disease is tuberculosis. I have not, however, met with a case of tuberculous ulceration of the pharynx in which tuberculosis of the lungs has not been definitely established.

Dr. H. J. BANKS DAVIS: It looks as if the patient had drunk corrosive fluid or boiling water. I remember a nurse in a hospital who was supposed to have periodical attacks of diphtheria; and whenever she wanted to get away she touched her tonsils with caustic, which produced a diphtheritic appearance.

Abstracts.

PHARYNX.

Schoolman, N.—The Bipolar Origin of the Fauical Tonsil. "The Laryngoscope," 1915, p. 338.

Male, thirty-six years, had diphtheria and scarlatina in childhood. On the right side the tonsil fossa is occupied by two tonsillar masses which are completely separated by a deep, transverse recess. A large

lymphoid mass is situated at the pharyngeal aspect of the posterior pillar, and is apparently a continuation of the upper tonsil. On the left side the conditions are similar.

Schoolman admits that his patient had a severe throat infection in childhood, and that the peculiar appearance may be the result of an extensive necrosis. On the other hand, it is difficult to believe that ulceration could have split both tonsils in half. Further, the space is free from cicatricial tissue or adhesions. For these reasons the writer holds that the conditions are due to congenital anomaly.

Gruenwald found that in the third month of foetal life folds appear in the second branchial arch, which gradually enclose a part of the second branchial cleft, which soon becomes the seat of tonsillar formations. The enclosed area is marked off by a transverse septum into an upper portion (fossa tonsillaris) and a lower portion (sinus tonsillaris). In these two areas tonsillar growths appear. About the sixth month the two tonsillar masses approach each other. The space between the upper tonsil and the palatal arch is the recessus palatinus, and the one between the upper and lower tonsil masses is the recessus intertonsillaris. Histologically the lower tonsil resembles the thymus gland. This foetal condition is sometimes met with in early childhood, but later is obscured, because (1) the upper and lower tonsil masses merge into each other, (2) the transverse septum is obliterated, and (3) the lower tonsil tends to involute. One often finds, however, in submerged tonsils a transverse band of mucous membrane (plica transversa) marking the place of the original dividing line. Viewed in this light, the present case may be considered as an instance of persistence of embryological formations.

J. S. Fraser.

Hudson-Makuen, G.—The Relation of the Lymphoid Tissue in the Upper Respiratory Tract to the Voice. "The Laryngoscope," 1915, p. 46.

This short article is a plea for conservatism in tonsillar surgery especially in singers. The author holds that every child should be regarded as a possible singer. He admits, however, that degenerated tonsils are injurious to the voice because they cause congestion, and, further, that abnormalities which are deleterious to a patient's general health, are also deleterious to the voice. Extra-capsular tonsillectomy should only be performed "when the damage to the pharynx and the individual threatens to become greater by leaving it undone."

J. S. Fraser.

NOSE.

Goodale, J. L.—Pollen Therapy in Hay Fever. "Annals of Otology," xxiv, p. 269; and **Hays, H.—Experiments with Auto-serum in the Treatment of Hay Fever. The Relation of Anaphylaxis and Eosinophilia to Hay Fever. A General Survey of New Methods of Treatment.** *Ibid.*, p. 287.

It is advisable to consider these two papers together. Goodale's conclusions are that serobiologic methods have shown phylogenetic relationship of the different plant orders and families. The application of these discoveries to the treatment of hay fever by injection of plant proteids promises to assist in the selection of the specific material required for a given case.

Definite reactions are elicited in hay fever by the pollen of the exciting plants when brought into contact with an abrasion of the skin. The intensity of these skin manifestations may be sensibly diminished by the repeated parenteral administration of the proteids in question. Coincident with diminution in the skin reactions seems to occur an increased tolerance of the exposed mucous membranes to the pollens of the plants employed. Pollen therapy in hay fever may be regarded at the present time as a promising method of treatment, but its value and the permanence of its results remain still to be definitely established.

Hays, as a result of the encouraging reports in the treatment of various persistent and chronic dermatoses by autoserum, which led Gottheil to think it worth while applying similar treatment in hay fever, began a series of experiments upon similar lines. His methods and results are recorded in the second paper, in which he gives details of seven cases, mentioning five others. Each was given two or more injections of from 5 to 15 c.cm. of serum. In every instance the treatment was a failure.

Macleod Yearsley.

ŒSOPHAGUS.

Chamberlin, W. B.—Removal of an Open Safety-pin from the Œsophagus under Suspension. "The Laryngoscope," 1915, p. 18.

The writer claims, after a careful review of the literature, that this is the first case in which an open safety-pin has been removed from the œsophagus (*sic*) by the suspension method. Child, aged eleven months, had swallowed the pin an hour before. A radiogram showed the pin at the upper end of the œsophagus [in the hypopharynx (Abstractor)]. The catch of the pin lay to the child's right, while the point was directed to the left. The catch was grasped with forceps and pushed to the left, thus rotating the pin. The shaft of the pin was now grasped with a second pair of forceps, and complete rotation accomplished. The pin was then grasped by the eye and removed. The case illustrates the advantage of having both hands free to operate, as in the suspension method.

J. S. Fraser.

EAR.

Scruton, Wm. A.—Accidental Injuries of the Sigmoid Sinus inflicted in Simple Mastoidectomy. "Annals of Otology," xxiv, p. 310.

Four cases are reported, three of which developed septic thrombosis, two of which ended fatally. The author concludes that accidental injury of the wall of the sigmoid sinus primarily would appear to be of no great consequence unless infection gains entrance to the protective clot. Therefore, more than usual antiseptic treatment of the mastoid cavity in such cases is imperative.

Macleod Yearsley.

Smith, MacCuen.—The End Results of the Radical Mastoid Operation. "The Laryngoscope," 1915, p. 332.

The first *bonâ fide* mastoid operation was performed in 1858, and reported by von Trölsch in 1861. Schwartze, in 1885, advised opening the mastoid for the cure of chronic suppuration. In 1889 Küster proposed chiselling away the back wall of the meatus, converting the external auditory canal, mastoid antrum and cells and tympanum into

one cavity. In 1891 Stacke published his new method for opening the mastoid for the relief of chronic suppuration.

MacCuen Smith has only operated on cases that have utterly failed to respond to persistent non-operative treatment and in urgent cases. In a large percentage of these chronic cases the middle fossa is found to be unusually low, the sinus in some instances being so far forward as to occupy (*sic*) the greater part of the antrum; hence the advantage of a radiogram. The writer has sent letters to 334 patients, of whom about two-thirds responded. Some of the patients had not been treated since they ceased their hospital visits. Smith thinks that about *three months* would seem to be a fair average for after-treatment in hospital cases. Unfortunately he does not give detailed figures of his results; he says that complete cessation of all discharge is obtained in about 80 per cent. of cases treated as hospital out-patients, while in private work the percentage is ninety, or better. The time of repair is lessened materially by the use of skin-grafting. He has never seen an intra-cranial complication develop after a radical operation has been performed. The largest percentage of the cases by far were between the ages of twenty and thirty. The degree of hearing depends on the condition of the tympanic wall, more particularly on *whether the round or oval windows have been disturbed during the operation.* [*Italics abstractor.*] The hearing of the average case should be as good after as before operation. In 30 per cent. of cases the hearing was better after operation, in 50 per cent. it was the same, and in 20 per cent. it was worse. In the 334 cases there were 8 of post-operative facial paralysis. [The writer does not say at what period after operation the paralysis appeared.—Abstractor.]. Of the eight cases four recovered, two almost recovered, and two improved only slightly.

Smith does not recall a single death occurring in his own practice which could not be attributed to an intra-cranial complication already present before operation. He holds that ossiculectomy and the various methods of treating or closing the Eustachian tube will, at times, bring about a cessation of discharge, but this can only be anticipated when the tympanic cavity or the tube is the site of the disease, and not the mastoid process.

J. S. Fraser.

MISCELLANEOUS.

Carmody, T. E.—Oral Tuberculosis. "Annals of Otology," xxiv, p. 193.

Reports 17 cases in full, and abstracts in tabular form 534 cases, with 661 lesions, distributed as follows: Tonsil, 48; pharynx, 51; palate, 97; upper jaw, 48; lower jaw, 36; cheeks, 16; tongue, 277; lips, 48; location not specified, 40. The paper, which is profusely illustrated with colour and other plates, forms a useful *résumé* of its subject, and requires to be read in its entirety. Macleod Yearsley.

Russell, L. Cecil (New York City).—*Streptococcus viridans* in its relation to Infections of the Upper Respiratory Tract. "Laryngoscope," 1915, p. 97.

Cecil adopts Schottmüller's classification of the streptococci: (1) *Streptococcus hæmolyticus*; (2) *Streptococcus viridans* (*mitior*); (3) *Streptococcus mucosus*. The *S. hæmolyticus* is associated with suppurative or phlegmonous inflammations, while the *S. viridans* causes the milder catarrhal processes. The *S. viridans* is a very small gram-

positive diplococcus which grows in pairs or short chains. On glucose blood-agar surface colonies show as minute rounded grey dots with a narrow halo of green. *S. viridans* is associated almost exclusively with chronic infective endocarditis, but Cecil maintains that it should be thought of as an inhabitant of the mouth and respiratory tract, as it can be isolated from practically every normal mouth and throat and is more abundant than the *S. hæmolyticus*, the *S. mucosus*, or the strepto-pneumococcus. Of the eighty-nine cases observed by Cecil, fifty showed a predominance of *S. viridans*, while next to this came the closely related pneumococcus, which, including the *S. mucosus*, was predominant in 20 per cent. The *S. hæmolyticus* came third, 6 per cent. The remaining 17 per cent. was divided between *B. influenza*, *M. catarrhalis*, *B. Friedländer*, staphylococci, etc. According to Cecil, staphylococci play a very insignificant rôle in infections of the upper respiratory tract.

Cultures were obtained as follows from the tonsil: A sterile platinum wire was inserted as deep as possible into one of the crypts, and the material removed was spread over the surface of blood agar plates with a sterile glass rod. Out of twenty-one cases of tonsillitis the *S. viridans* was present in sixteen, sometimes in pure culture. Cases of acute tonsillitis, in which the *S. viridans* was predominant, were usually mild, whereas in cases of scarlet fever or quinzy the *S. hæmolyticus* was usually present. In acute tonsillitis associated with rheumatic fever (five cases) the *S. viridans* was a predominant organism, and in one case was present in pure culture. Rosenow has recently cultivated from the joints in rheumatic fever streptococci resembling the *S. viridans*: this organism is probably identical with Porvinton and Pane's *Streptococcus rheumaticus*. In one case of chronic tonsillitis and arthritis, in which the *S. viridans* was predominant, the tonsils were removed and the joints immediately began to improve. In some instances Cecil observed a combination of pyorrhœa and tonsillitis with arthritis.

Goadby has examined ninety-three cases of pyorrhœa and found a streptococcus in fifty-five and a staphylococcus in sixty-three. Cecil has examined twelve cases of pyorrhœa and obtained an abundant growth of *S. viridans* in every case. Several of the cases showed arthritis, nephritis, and one endocarditis. *Nasal Cavities*: Cultures from the nose in the acute stage of coryza are often sterile, but later on various organisms are present. In 1894 Cantley described the *B. septus*, and his observations were confirmed by White and Walter. Allan holds that the complaint is due to a streptococcus, while Tunncliffe has described a small spirochæte both in acute and chronic coryza. Schottmüller frequently found the *S. viridans* in pure culture in acute and chronic rhinitis. Cecil has examined fourteen cases and found the *S. viridans* in five. He holds that coryza due to the *S. viridans* nearly always starts in the throat and extends upwards or downwards, or both. A vaccine of the organism was very effective in one case. *Nasal Accessory Sinuses*: Cecil reports on nine cases of sinusitis, and in three he found the *S. viridans* predominant. *Middle-ear Affections* are rarely due to the *S. viridans*; only one out of thirteen cases studied by Cecil. *Bronchitis*: Fourteen cases studied, in eight of which the *S. viridans* was predominant or present in pure culture. Vaccines of the organism were successful. J. S. Fraser.

REVIEW.

Chevalier Jackson on Per-oral Endoscopy and Laryngeal Surgery.

Per-oral Endoscopy and Laryngeal Surgery. By CHEVALIER JACKSON, M.D., Prof. of Laryngology, University of Pittsburg, etc. With 6 coloured plates and 490 other illustrations. The Laryngoscope Co., St. Louis, U.S.A., 1915.

(Continued from p. 119.)

DEEP PHARYNGOSCOPY.

We have already alluded to Jackson's preference for endoscopes of small calibre necessitated by his detached attitude on the employment of anæsthetics. We have also acknowledged the conspicuous share he has taken in the education of endoscopists as to the correct position of the patient's head in the dorsal decubitus, and to his advocacy of the dorsal table position as the position of choice for ordinary routine work in the gullet.

In his early work Jackson displayed very hazy notions concerning the lower pharynx, more especially as to where it ended and the œsophagus began. These notions are now stated more definitely, but they are still wrong. The mouth of the œsophagus, or as he formerly called it the "introitus œsophagi," continues to be confused with the lower sphincteric orifice of the pharynx, lying immediately *above* the level of the lower border of the cricoid cartilage and surrounded by the lower horizontal or sphincteric bundle of fibres of the inferior constrictor muscle (crico-pharyngeus). He writes of the "crico-pharyngeal constriction of the *œsophagus*"—a contradiction in terms; and what is still worse, the same terminology is applied to two different constrictions. In the last paragraph on p. 179 it is applied to the "crescentic crevice visible by direct laryngoscopy back of the arytenoid eminence and ary-epiglottic folds where these meet the postero-lateral pharyngeal wall"; and thus refers to a level actually *above* the cricoid! "This crevice is the entrance to the hypo-pharynx." Others would have said the mouth of the pyriform fossa. Elsewhere the "crico-pharyngeal constriction of the *œsophagus*" refers obviously to the lower or sphincteric orifice of the so-called hypo-pharynx, which orifice Jackson, in common with others, confounds with the mouth of the œsophagus. The latter orifice, of course, is really situated immediately *below* the level of the crico-pharyngeal sphincter. All this confusion was aggravated by Killian, who was the first, however, to recognise, in 1908, the importance of the sphincteric character of the lower bundle of fibres of the crico-pharyngeus and the endoscopic significance of the projecting posterior lip, and yet illogically referred to this lowest sphincteric portion of the pharynx as the sphincteric mouth of the œsophagus. Jackson quotes from a paper by an English endoscopist dealing mainly with another matter, but he does not allude to the paragraph in the same article in which the above error was exposed, and we may conclude that he failed to appreciate the criticism. Not so, however, Prof. Keith, who also had formerly arrived at the same conclusion as Killian, for in a recent article by Keith he alludes to "the pharyngeal sphincter," "which I have mistakenly described as an upper œsophageal sphincter." These surely ought to be the last words on this question.

Again, pharyngeal pulsion diverticula, which are localised hernial protrusions of the mucous and fibrous coats of the pharynx and actually

pass out *between* the upper and lower portions of the inferior constrictor muscle, are invariably alluded to by Jackson as *oesophageal* diverticula or pouches. Their pharyngeal nature and origin was first recognised by Rokitansky, and later confirmed, after many investigations of museum and other specimens, by Zenker. Moreover, Morell Mackenzie, Butlin, and others who continued to use the old terminology, admitted that these pouches were really often purely pharyngeal or else pharyngo-oesophageal in origin. There is, however, no warrant for the latter view, and Jackson has misread Killian when he attributes the statement to him that these pouches pass out between the lower sphincteric or fundiform fibres of the pharynx and the circular fibres of the oesophagus (p. 180). Killian distinctly recognised that they passed out *above* the fundiform, *i. e.* the sphincteric bundle of the crico-pharyngeus muscle, and therefore were in no sense oesophageal pouches.

Foreign bodies arrested in the post-cricoidal pharynx are classified as impacted in the oesophagus. (See Kyle's case and skiagram of a denture impacted for eighteen years, p. 358; also StClair Thomson's tabular illustration reproduced on p. 329, in which no less than twelve foreign bodies alleged to be in the oesophagus are seen to be located *above* the lower border of the cricoid.) Again, the statistics of malignant growths in the deep pharynx and in the upper portion of the oesophagus respectively have been vitiated by these perverse departures from anatomical accuracy.

Endoscopic examination of the deepest portion of the pharynx, viz., that situated behind the arytenoids and cricoid plate, is to be carried out by an elongated modified form of his laryngoscope, and this instrument Jackson characteristically names the *oesophageal* speculum. It is, of course, a combined long pharyngoscope and short oesophagoscope, and differs from his ordinary tubular oesophagoscopes in that it is like his laryngoscope, tubular in its proximal half, gutter-shaped in its distal half, and the spatular distal extremity is less bulky than his laryngoscope. It is a very serviceable endoscope and generally preferable to a cylindrical one, more especially in removing foreign bodies behind the cricoid.

Suspension pharyngoscopy is dealt with earlier by Killian himself.

Jackson does not now mention the expanding endoscopes for deep pharyngoscopy brought out by Mosher and others.

The author follows the herd in calling attention to von Eicken's method of deep pharyngoscopy. He mentions the point noted by Killian, that enormous force is required to pull the larynx away from contact with the posterior pharyngeal wall, but we could have wished that, while he was about it, he had candidly stated that the method was one which few endoscopists would be likely to employ twice.

Some of the endoscopic procedures in the deep pharynx were alluded to under the section of laryngoscopy, and included the diagnosis of malignant disease and other lesions, together with carrying out applications of radium and surgical diathermy. No mention was, however, made there or elsewhere of the palliative surgical removal of considerable portions of large malignant tumours arising from the pharyngo-laryngeal party wall and from the post-cricoidal pharynx for the temporary relief of obstruction to breathing and swallowing and the avoidance of tracheotomy, of intubation or of gastrostomy. Such palliative interference, though considered unsurgical in some quarters, has been amply justified by results in our own practice.

Formerly Jackson did not condemn *in toto* the employment of an obturator or a bougie as a guide to the passage of an oesophagoscope or

of a gastroscope through the spasmodically closed pharyngo-œsophageal junction. All blind methods are now, however, absolutely interdicted as opposed to the essential principle underlying endoscopy, namely, advancing under visual guidance step by step from start to finish. His pronouncement that the blind passage of a bougie, whether for diagnosis or treatment, is unjustifiable in any circumstances, will be considered by some as too rigid, more especially in regard to the treatment of stenoses which have been œsophagoscopically found to be undoubtedly benign. We may here in passing note that Jackson, by using only small calibre œsophagoscopes—the largest being 10 mm. in diameter—is thus restricted to the endoscopic employment of bougies which do not exceed 8 or 9 mm. in diameter. This means inefficient bouginage.

The author agrees with Brünings that the most difficult and dangerous stage in attempting to insert an endoscope into the gullet is on approaching the region of the spasmodically contracted pharyngeal sphincter. Jackson, it is true, uses less accurate phraseology, for he alludes to the "unconquerable barrier" (quoting Brünings) opposed to the passage of the endoscope during spasm by "the posterior lip of the œsophageal (*sic*) mouth." In order to pass through this pharyngeal sphincteric area, the position of the patient and the direction of the endoscope (its long axis corresponding to that of the upper portion of the gullet) is all important. If a general anæsthetic is not used the patient should be instructed to breathe quietly and regularly, and, we might add, slowly and deeply. He rightly insists that the performance of the movements of swallowing, when the patient can accomplish it, aids materially. We may add that if the patient fortunately manages to eructate air upwards, this act in a small way relaxes the pharyngeal sphincter and the cricoid resistance vanishes, the larynx moves freely forward, and the open pharyngo-œsophageal junction is easily seen and traversed, provided the direction of the endoscope is correct. Once within the cervical gullet matters are comparatively simple.

It may be felt that, like Jackson, we have dwelt too long on these elementary procedures, but it must be remembered that the passage of this region is the one endoscopic manipulation which is fraught with real danger if one's technique is not punctiliously correct. Although personally opposed to anæsthetics, Jackson, of course, recognises that these manipulative difficulties and dangers are much reduced by chloroform, on which many of us largely rely for all serious work in spite of the author's confident assertion (p. 180) in connection with œsophagoscopy, that "no endoscopist expects to use a general anæsthetic in any but exceptional cases."

ŒSOPHAGOSCOPIC FINDINGS.

The description of the technique of the passage of the œsophagoscope through the deep pharynx and through the gullet to the cardia is clear and correct except in the matter of pharyngeal nomenclature. We are glad to find that Jackson does not often refer to the compressed portion of the œsophagus at the phrenic level (*i. e.* where it passes through the hiatus in the diaphragm) as the hiatus itself; but more usually employs the better term "hiatal constriction." There is, of course, no hiatus in the œsophagus; it is a hole in the diaphragm. The potential lumen at the level of the hiatus is generally described as taking the form of a slit, the long axis of which passes obliquely forwards to the left. Jackson, however, correctly points out that the rosette form is as common, if not commoner, than the slit form, and makes the suggestive remark that

many œsophagoscopists have thus been led to mistake this rosette-like lumen at the hiatal level for the cardiac orifice.

The author insists that evidence of spasm should always be looked for in passing the œsophagoscope, more especially on approaching the pharyngo-œsophageal junction and again when nearing the phrenic level.

Jackson is entitled to the credit of being the first to point out that functional stenosis is almost always at the phrenic level rather than at the cardia, and in his previous book he maintained that in those rare instances of true functional spasmodic stricture the condition was of the nature of phreno-spasm rather than cardio-spasm.

Brown-Kelly, however, has defended the cardio-spasm hypothesis, but he has been careful to point out that he has in mind mere want of relaxation of the ordinary tonus of the circular fibres of the cardiac orifice rather than true hypertonic spasm. Hertz, who still refers the site of functional stenosis to the cardia rather than to the hiatal level, but rejects the spasm theory in favour of want of co-ordinate relaxation at the appropriate moment, uses the more acceptable terminology of "achalasia" of the cardiac orifice. Jackson has experience of only three cases of cardio-spasm, and "believes that is only rarely, if ever, that spasm exists below the hiatal level." With this we cordially agree, and we have elsewhere ventured to doubt if *primary* idiopathic spasm occurs at any level in the phreno-cardiac portion of the gullet. Jackson formerly referred the assumed spasm to the crura of the diaphragm, *i.e.* not within the gullet at all, and apparently still does so, in which case his former nomenclature of "phreno-spasm" should not have been relinquished in favour of "hiatal œsophagismus." The special mark of hypertonic spasmodic muscular contractions in the alimentary tract is painful colic or cramp, and the special mark of spasm of the diaphragm is hiccough. When neither of these symptoms is present there is probably no spasm, but we suggest that there may be achalasia of the crural fibres bounding the phrenic hiatus *for* the œsophagus. This hiato-crural achalasia would fit in with the findings in the comparatively small number of cases of genuine primary functional stenosis which have been accurately investigated and recorded. The bands passing from the hiatal margin to the gullet, described by Rouget and by Liebault, and referred to by Jackson, lend support to this explanation. We may suppose that during the normal co-ordinate act of deglutition the hiatal orifice in the diaphragm becomes largely open and round instead of collapsed, owing to the relaxation of the circumferential fibres of the crura, and these bands connecting the margin of the hiatus with the gullet would tend to open the lumen of the latter viscus, these probably being dilating fibres instead of constricting ones, as Liebault supposes.

Although, then, there are no special sphincters, *i.e.* circular muscular aggregations, actually in the gullet, at either end or elsewhere, the decussating fibres of the crura of the diaphragm bounding the hiatus form a potential but extra-œsophageal sphincter for the gullet, but not incorporated in it.

Writing of the conditions observed after section of both vagi, Jackson remarks that "division of these nerves causes contraction of the œsophagus in the neighbourhood of the cardiac orifice, as though there were inhibitory fibres supplied only to the region of the cardia." He probably has in view Brown-Kelly's findings on repeating this experiment of cutting the vagi in the cat, that whereas the thoracic gullet appeared relaxed and dilated when radiographed after a bismuth meal the phreno-

cardiac segment remained closed as before section. Brown-Kelly inferred want of relaxation of normal tonus (achalasia) of this segment, whereas Jackson goes further and assumes hypertonic contraction or spasm due to the presence of inhibitory fibres—an unverified and probably unverifiable assumption. Instead of falling back on far-fetched assumptions we prefer the obvious explanation which is ready at hand. Section of the vagi causes paralysis of the circular muscular fibres of the œsophagus, and normal muscular tonus is thus abolished with relaxation, and further on account of the *negative* pressure in the thorax the lumen of the thoracic gullet becomes more expanded than even the normal cadaveric gullet; on the other hand, the paralysed phreno-cardiac portion of the gullet remains occluded as before section on account of the *positive* intra-abdominal pressure. What more obvious than this? And what possible light can these experiments throw on the alleged conditions of cardio-spasm and cardiac achalasia? We think none.

Many dysphagic conditions diagnosed as functional and labelled cardio-spasm are doubtless, as Jackson maintains, due to a definite anatomic narrowing of the lumen of the phreno-cardiac and of the lower thoracic portions of the gullet due to inflammatory swellings and contractions, and some of these cases probably result from former peptic ulcers. The fact that the œsophageal stasis is relieved by dilating methods of treatment, viz., by bouginage, dilating bags, and expanding metal divulsors is, we think, strong presumptive evidence against functional causes, *e.g.* either spasm or achalasia, and in favour of an anatomic organic lesion of some kind being present in all cases so relieved.

We have dealt at length with the question of the inadequacy of the explanations of functional stenosis at the hiatal level and resulting general ectasia of the gullet, because Jackson was not only the first to cast doubt on the prevailing cardiospasm hypothesis as the result of his careful endoscopic and radiographic investigations, but has done more than anyone else to put us on the right level, even though we may not be able to agree with his explanations in their entirety.

The description of the typical and of the atypical endo-œsophageal appearances within the limits of normality are perhaps on the meagre side. Every now and then one finds a succession of transverse annular and falciform ledges or folds which might lead a beginner to imagine he had entered a large trachea by mistake. These folds are not described. We agree with Jackson that short, longitudinal folds are sometimes found in normal cases low down and converging to the collapsed phrenic segment. These folds are exaggerated in inflammatory strictures at this level, and are also found above cicatricial strictures at any level. Judging by Jackson's illustrations, however, longitudinal ridges are common throughout the gullet in normal as well as in pathological conditions, which we hold is contrary to fact, and can hardly be explained by taking into account Jackson's practice of using small tubes not exceeding 10 mm. in diameter.

His circular illustrations of endoscopic findings measure 22 mm. in diameter, so we must assume that they represent composite views, as they are evidently drawn to scale and not enlarged, judging by the size of the arytenoids in Plate III, fig. 1, and the coin in Plate III, fig. 10. Of eight coloured illustrations, which are labelled normal œsophagoscopic views, no less than four are actually pharyngoscopic, and another one is gastrosopic; the remaining three, however, really are œsophageal views, but all are atypical, though within the limits of normality. The coloured views of pathological conditions are better, but again mostly atypical.

DIVERTICULA.

Jackson follows the conventional division of these localised herniæ or protrusions into traction and pulsion pouches. The traction variety is "a rare condition, and still more is its endoscopic discovery, because it usually causes no symptoms." No mention is made of true œsophageal pulsion protrusions, which are very occasionally seen in museum specimens of general dilatation of the gullet as fairly large and wide basin-shaped lateral sacculations therefrom. The commoner pulsion diverticula of the lower pharynx which pass through the inferior constrictor are well dealt with and at considerable length, but are incorrectly alluded to throughout as œsophageal lesions. Jackson lays great stress on their diagnosis by endoscopic methods. As a matter of fact, the diagnosis is always clear from a study of the classical symptoms (including the old and well-known "gurgling sign," here wrongly attributed to his colleague Boyce) combined with an X-ray examination and bismuth meal. As Jackson is very insistent that radiography should always precede endoscopy, it follows that there should be no scope left for the latter from the diagnostic standpoint. It is well, however, that the tyro in endoscopy should know that when the tube passes with unusual ease through the dilated post-laryngeal pharynx and well beyond it without arrest at the crico-pharyngeal lip of Killian that a pouch should be suspected, although this sequence may occasionally also be observed, though Jackson omits to mention it, in marked dilation of the upper part of the gullet and of the pharyngo-œsophageal junction in cases of old, tight strictures of the mid-thoracic gullet. The difficulty of finding with the œsophagoscope the prolapsed and slit-like pharyngo-œsophageal orifice or junction is usefully pointed out.

Jackson thinks that the insertion of the endoscope into the pouch, as proposed by Gaub, forms a valuable adjunct during the surgical removal of these sacs, through a cervical incision, for the purpose of localising and defining the pouch. The more usual plan is to pass blindly through the mouth a metal sound or a firm gum-elastic bougie into the pouch. Having, as it happens, tried both methods, we can affirm that the employment of the endoscope, with or without the complicated technique insisted on by Jackson, possesses no advantages whatever over the use of the sound, which is simple and quite efficient.

Jackson announces that he has devised "an operation in which, by the use of the œsophageal speculum (fig. 21), the bottom of the sac may be grasped by forceps and drawn in, encircled by a ligature, and the end cut off and sealed over with a touch of tincture of iodine about half strength. As yet no suitable case for this operation has come under the author's observation. Glottic spasm resulted every time traction was made in the two cases tested." If Jackson had had any personal experience of dissecting out a pouch and freeing its adhesions to neighbouring structures he would never have committed to print this example of surgical inspiration. The space would have been better filled with an epitome of the variations in operative technique employed by Halstead, Goldmann, and Neumann respectively.

No mention is made of those rare congenital forms of pharyngeal diverticula situated higher up and in a more lateral position than the pulsion variety, and which pass out through the thyro-hyoid membrane.

COMPRESSION STENOSIS OF THE GULLET.

The author mentions benign and malignant enlargements of the

thyroid and lymph glands in the neck as a cause of compression of the cervical and upper thoracic œsophagus. He does not, however, state that this is very rarely observed and that the stenosis is usually due rather to actual invasion in malignant disease. "Thoracic compressions are usually from mediastinal lesions"; but the author does not state that mediastinal growths rarely cause marked dysphagia, whilst mediastinal abscesses, which are not mentioned, almost invariably do so. Jackson has observed one case of compression from an aortic aneurysm, and says that a number of such cases have been recorded; he might have added, however, that on account of the mobility of the gullet in the lax mediastinum it is most exceptional for aneurysm of the aorta to cause dysphagia: and the same may be said of cardiac hypertrophy and abscesses of the lungs and pleuræ. On the other hand, innominate and subclavian aneurysms are much more likely to seriously compress the upper gullet, as shown by Dan McKenzie and others.

In this section there are other important omissions. Pharyngeal diverticula of any size always cause more or less dysphagia by compression on the upper two or three inches of the gullet. These herniæ are inaccurately placed under the heading of œsophageal pouches.

Jackson rightly states that it is doubtful if scoliosis produces any compression of the œsophagus, but we are curious to know what warrant there may be for his statement that "lordosis is a not infrequent cause of compression of the cervical œsophagus."

The author teaches that stenoses in the lower part of the gullet are rarely compressive, but omits to mention the two conditions which, though rare, are invariably associated with some dysphagia on account of angulation of the subphrenic gullet. We allude, of course, to diaphragmatic hernia and to eventration of the diaphragm, in each of which the stomach is displaced upwards and assumes a thoracic position, thus altering the direction of the lowest portion of the gullet and kinking it. The endoscopic findings in angulation from either of these causes have not, we think, been described, as the diagnosis is always easily arrived at by physical examination and by the X-ray screen.

RUPTURE AND TRAUMA OF THE ŒSOPHAGUS.

The author in a short section is reticent as to what he thinks is the field of usefulness of endoscopic methods on rupture of the gullet. In writing of a rupture extending through to the pleural cavity, he naturally mentions pneumothorax, and adds, "in such cases tapping of the pleural cavity will usually obtain a small amount of fluid with *fecal* odour"! In two such cases under our observation there was well-marked hydro-pneumothorax, but no special odour. The word "fecal" is obviously a printer's error, which unfortunately escaped detection in the revision of the proofs, the only instance of such which we have noticed in the entire work. What characteristic odour Jackson had in mind we are unable confidently to suggest, as we hardly think he would state that there usually is a *fetid* odour in the early stages of rupture of the gullet extending to the pleural cavity. Rupture from vomiting would, of course, produce an odour due to the escape of the gastric contents into the pleural cavity, but only in the later stages would the empyema become fetid and never fecal.

Jackson advises immediate gastrostomy *under local anaesthesia* in all cases of rupture of the gullet whether due to trauma or to vomiting. In two cases under our care resulting from instrumentation the stomach was not opened and the small hole in the gullet closed, so that there was no leakage, in one case in three days and in the other in five days; a subphrenic

abscess formed in the former and there was pleural empyema in the latter, both of which, of course, were opened. It should have been pointed out that in a *large transverse rent* from vomiting recovery is unlikely with or without gastrostomy.

CICATRICIAL STRICTURE OF THE GULLET.

The cause of a fibrous stricture is either fairly obvious or extremely problematical. The swallowing of an escharotic fluid is a clear example of the former. A history of an impacted foreign body with resulting ulceration and perhaps traumatism during extraction may explain other cases. But "every œsophagoscopist of large experience has seen cases of cicatricial stenosis of the œsophagus in which he is utterly at a loss to discover the original cause." Jackson gives the possible causes in the following order:

I. Ulcers in tuberculosis, syphilis, scarlet fever, diphtheria, and other pyogenic conditions.

II. Primary functional spasm producing "organic stricture by the erosions due to the accompanying œsophagitis." Jackson admits that spasmodic stricture is only found at (*a*) the crico-pharyngeal constriction, which is not in the gullet at all; (*b*) at the level of the hiatus, where, according to him, the spasm is really extra-œsophageal in the crural fibres of the diaphragm; and (*c*) in the abdominal œsophagus near the cardia; and he rightly states that primary spasm never occurs in the thoracic gullet. The only form of actual primary spasm of the gullet leading to fibrous stenosis is therefore by implication reduced to cardio-spasm, using that term in its wider sense of spasm of the subphrenic portion of the œsophagus and not merely of the cardia.

III. Peptic ulcers, which occur usually in the lower two inches of the gullet.

IV. Typhoid decubitus ulcers. The author claims five cases; but four were, it appears, in the post-cricoid pharynx, and the solitary case of gullet ulcer was at the level of the left bronchus.

V. Slight congenital stenosis tending to fibrosis in later life, as originally suggested by Brown-Kelly.

VI. Foreign bodies causing ulcerations.

With the exception of peptic ulcers we think the possible causes enumerated in the above list can rarely be invoked to explain the large group of cases of fibrous stenosis in which the cause is problematical, more especially those occurring in the thoracic gullet. The extreme rarity of stricture after foreign bodies is a matter of surprise, but a fact; and the spasmodic hypothesis is for us as unconvincing as the assumption of previous ulcers in cases with no history of pain, on swallowing, extending over days or weeks.

There is a good description of the various endoscopic appearances observed in the author's cases. Per-endoscopic treatment rather than gastrostomy is, in Jackson's opinion, usually indicated, consisting of removal of impacted food from the narrowed lumen and dilating up the stricture by graduated bougieing through the œsophagoscope. As the calibre of the largest endoscope used by Jackson is only 10 mm. outside diameter, it can be seen that he is only able to use small bougies, and can never widely dilate a stricture in the manner of those who employ 18 mm. and 20 mm. tubes. He sanctions the use of an expanding divulsor (either his own or Mosher's) where the lumen admits of its insertion, but "personally the author has found nothing to equal bouginage per tubam." A word of warning as to the dangers of

even dynamometric divulsors might have been expected. Curiously enough, no mention is made of the employment of Gottstein's pneumatic and hydrostatic dilating bags, which are alluded to in the treatment of spasm however; and the various methods of intubation are dismissed in a short paragraph suggesting that Jackson differing from others has not often found it necessary to use these aids in fibrous strictures.

Guisez reports excellent results after internal œsophagotomy, but Jackson, after using the string-cutting œsophagotomy in a number of fibrous strictures without serious complications, announces that he has abandoned the method, agreeing with Killian that it is "an extremely dangerous procedure." After this pronouncement we scarcely expected to read on p. 562 that "once established, cicatrices of luetic origin are extremely stubborn to treat, and may require the string-cutting œsophagotomy or other form of internal œsophagotomy." Jackson regards syphilis of the gullet as a relatively rare disease, and no doubt rightly asserts that "no one has seen a sufficient number of cases to be able to classify the endoscopic pictures."

He mentions without comment Guisez's claims to have had excellent results from electrolysis. Per-endoscopic ionization has been carried out in the gullet by a few specialists, but most of us have been deterred on account of the possible danger due to the uncertainty of limiting the action to the cicatricial area alone.

Gullet strictures which are impermeable to per-endoscopic bougieing, even after a period of functional rest afforded by gastrostomy, are usually left to their unfortunate fate of depending on alimentation by the gastric fistula for the rest of their days, with the attendant trouble from inability to swallow the greatly increased saliva. Jackson does not adopt this supine attitude. In strictures high up he advises that an endeavour should be made to restore patency by cervical œsophagotomy. In those lower down in the thorax combined per-oral and per-gastrostomic (retrograde) œsophagoscopy is to be performed, and the distal illuminated ends of the endoscopes brought as near as possible together, and a new lumen made by incising with an œsophagotome or by tunnelling with a sound the intervening occluded area. Near the lower end of the gullet Jackson advocates the Brennemann method which was carried out on one of his patients, and though but a qualified success, the patient not attending regularly for subsequent bouginage, yet the internal œsophagotomy was successfully enough carried out. An additional high gastrostomy is first performed in order that the surgeon can more readily pass his finger through the cardia to the stricture until he can feel the distal end of the endoscope passed down to the stricture from above; a knife guided by the finger is then plunged through the stricture into the lumen of the endoscope above. This operation must not be confused with the somewhat similar operation of Mikulicz for digitally dilating up from below permeable strictures in the phreno-cardiac gullet, an operation not mentioned by Jackson.

The high form of temporary gastrostomy in which a chondroplastic flap is made to enable the surgeon's finger the better to reach well up the gullet is not definitely alluded to.

After the lumen by these various methods has been rendered continuous, a rubber tube is passed from the mouth through the gullet into the stomach and out of the gastric ostium, and secured at each end. Larger and larger tubes or bougies can thus be inserted.

Jackson does not mention the use of a somewhat similar method of dealing with a slightly permeable stricture where a shotted string is

swallowed and fished out through the gastrostomic orifice; the string then serves to draw through the stricture larger and larger bougies. By this method we were recently able to dispense with gastrostomic feeding in a patient who had not previously swallowed anything by the mouth for nearly four years.

MALIGNANT DISEASE OF THE GULLET.

Readers will naturally turn with special interest to that portion of this important chapter which deals with treatment. This may appear paradoxical in reference to a lesion which is almost always incurable. But though gullet cancer is not yet within the limits of surgical eradication, except when involving the extreme upper end, in few conditions is palliative treatment more urgent.

Jackson does not despair that thoracotomic extirpation may in the future claim an occasional success with the aid of early endoscopic diagnosis. It must be remembered, however, that dysphagia and the other revealing symptoms and signs of cancer in the gullet are late. Nearly every case has succumbed within a week or two of thoracotomy. Torek's patient did survive the operation, and so we believe has one other case. But radical cure is, we fear, quite another matter.

Gastrostomy, the author asserts, "is always indicated sooner or later." In this country hundreds of cases of gullet cancer have, with the aid of intubation, radium, and other measures, died swallowing fairly well to the end, not only without gastrostomy, but without any urgent indications for its performance. In our own practice non-gastrostomised patients can be reckoned in hundreds and gastrostomised in tens. We think Jackson would have been nearer the mark if he had said that to-day gastrostomy should hardly prove necessary in 10 per cent. of cases.

"(Esophageal intubation has been very successful in the author's hands." He appears to rely entirely on Symonds' well-known and excellent gum-elastic funnels, though he alludes to Guisez's non-ejectable rubber funnel, and gives an illustration of it. James Berry's method of inserting long, red rubber oro-gastric drainage-tubes and Symonds' modification of the same are not mentioned, nor is the employment of long rubber tubes strengthened by a flexible silver style to facilitate insertion and to prevent its being coughed or vomited up. The latter method has been extensively used here for many years.

Jackson writes of radium therapy that "he has seen marked effects in inoperable cesophageal malignancy, but so far no absolute cures. In none of the cases has sufficient time elapsed to pass final judgment upon the value of radium therapy in neoplasms. The author would prefer to wait three or four years before giving complete and tabulated data of his results." Jackson appears to have employed radium during the last two or three years only, but already an "author's method" is described and illustrated. "In order that other workers in this field may have the use of such technic as the author has developed, he deems it best to publish the technic in the hope that it may be helpful to other workers." It is unnecessary for us to indicate what is the technique "developed" by Jackson, beyond stating that he closely follows methods which are regarded as obsolete here, and were, in fact, discarded five or six years ago. The proved dangers of relying on a silk ligature for securing the radium capsule were pointed out at the discussion at Al-erdeen in 1914. Jackson, it is true, insists on the use of a "loop of heavily braided silk"; but the only reliable method is to employ a long flexible silver wire metallically

connected with the radium container; this not only secures the container but at the same time holds it in the required position and prevents it shifting up or down as the result of coughing or vomiting. Jackson does mention at the end of the chapter that he has just heard of this method, which, as is well known, has been almost exclusively employed here for five years at least.

We are glad to see that adequate weight doses are advocated; but while on p. 454 a screen of silver of less than a third of a millimetre thick is advised, on p. 424, in laryngeal growths, a screen "of not less than 2 mm. of metal," the nature of which is not stated, is recommended! The difficult questions of combined weight dose, screen dose, time dose, and repetition dose cannot usefully be summed up in the few scattered sentences Jackson is content to devote to them.

There are some important sections dealing with endoscopic methods in several other morbid lesions in the gullet which want of space precludes our referring to.

GASTROSCOPY.

In his earlier work Jackson devoted 33 pages to this subject, including a description of the various forms of indirect gastroscopes constructed on the principle of the cystoscope—that is to say, a lens-system inverted terrestrial telescope with a lateral periscopic window—together with an account of his own considerable experience with an open direct-vision gastroscope on non-inflated stomachs. He now gives us a short supplementary article of 10 pages in order to bring his former contribution up to date. Indirect lens-system gastroscopy has been extensively tried for a time by many endoscopists, but has failed to catch on; and direct gastroscopy, still enthusiastically advocated by Jackson, has not only failed to catch on, but has not even been extensively practised by others. He now includes some reference to the new method of combined direct and indirect vision gastroscopy which was first suggested by an endoscopist in this country (Hill) in 1909 and carried out here in 1910. Janneway, of New York, has annexed this principle in his more recent gastroscope, which is briefly described and illustrated. Jackson reproduces two coloured drawings, which he alludes to as "good illustrations of endoscopic views of the stomach through the Janneway lens system" gastroscope. These "good illustrations" are A and B respectively in Plate VI. A is described on p. 710 as an endoscopic view "looking in the direction of the pylorus," and B as a "view towards the fundus"; but as a matter of fact B in no way represents the fundus, but is really a view of the mouth of the pyloric antrum or lesser sac with a large oval and therefore non-typical distant view of the open pyloric orifice which normally appears as a smaller circular opening. The description of B evidently should refer to A, and depicts the convoluted mucosa as seen in a stomach which is only semi-inflated, and is typical of what is seen in the lower two-thirds of the greater sac of the stomach rather than of the fundus.

Killian, in his address at the International Medical Congress in 1913, said he doubted if gastroscopy would have any wide future, and Mayo Robson, Sherren, and others have expressed the opinion that its field of usefulness would probably prove to be a very limited one. So far from entertaining any invincible prejudice to the extension of endoscopic

methods from the gullet to the stomach, we may as well state that formerly, with a limited experience to go upon, we shared the optimism of Jackson and others as to the considerable possibilities of gastroscopy, but to-day we incline to the attitude of Killian and Mayo Robson.

Whatever the future of gastroscopy, whether it prove of wide application or not, we think it will be generally agreed that Jackson's exposition of its present position and of recent methods and findings is altogether inadequate, and that his advocacy of the use of the direct method alone without inflation is hardly convincing in spite of his own highly skilful manipulations having been attended by some measure of success.

On account of the length which this review has already reached we are compelled to hold over for a future issue notice of Part II of this work, which deals with those surgical measures in the larynx and trachea which are carried out through a cervical incision.

This "magnum opus" is the largest and most comprehensive work on per-oral endoscopic procedures in diagnosis and treatment which has yet appeared. Coming as it does from an extremely expert and learned specialist of world-wide repute, the number and variety of whose clinical endoscopic experiences can seldom have been equalled and probably never excelled, no excuse need be offered for according it a full analytical and critical notice. We have had to emphasise some major and many minor errors of commission and to point out several important instances of omission which were hardly to be expected in a comprehensive up-to-date treatise. When criticising adversely we have endeavoured, however, to be sufficiently explicit to enable our readers to judge whether our strictures were not merely polemically cogent but were fair and reasonable. If challenge and criticism appear to overshadow appreciation in this notice, it must not be assumed that we do not fully recognise that Jackson's endoscopic teaching viewed as a whole is of high merit and that this book is a monumental record of the large, varied, and highly successful personal experiences of an endoscopist of rare skill, ready resource, and refreshing, if not always convincing, originality.

As will have been gathered from the many quotations we have given, the author's style of writing does not always attain to the standard of the best English—we mean the best Bostonian English, of course. British readers will find that in parts it is frankly American, and sometimes colloquial at that. One is rarely in doubt, however, as to the author's meaning. He leaves the impression of endeavouring to advance his own views and claims with becoming modesty, and in criticising the teaching and practice of others his method is persuasive rather than aggressive.

The volume is well bound and is printed in large clear type on high-grade paper, and the large pages have wide margins. The book does credit to all concerned in its production.

It is a work which should be read and re-read by every progressive throat specialist, for it is a mine of information on per-oral endoscopy in general, and on the special methods favoured by Professor Chevalier Jackson in particular.

WM. HILL.

CORRESPONDENCE.

THE DANGEROUS REPUTATION OF ADRENALIN.

To the Editor of THE JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY.

SIR,—I should like to make a few comments on the Clinical Note in this month's issue,¹ and in so doing I will deal mainly with the use of adrenalin for intranasal operations. As to its use in other circumstances, my opinion is given in an article in *The Practitioner* (June, 1915), to which I would refer any who are interested in the subject. I will now only remark that as the injection of adrenalin into patients not under an anæsthetic, nor undergoing an operation, has so often been followed by symptoms resembling those of severe operative shock,² I am at a loss to understand how it can be advocated as a remedy for this condition.

Briefly then, arterial blood-pressure may be raised (1) by increase in the total volume of blood; (2) by increase in rate and power of the beat in the heart; (3) by contraction of arterioles—and adrenalin does so by (3) rather than (2). Although (2) may occur, either as a direct effect, or perhaps secondarily to (3)—for we are told by physiologists that dilatation of the heart is an incentive to vigorous contraction³—that organ may be unable to meet the call upon its energies which is made by sudden and excessive back-pressure. In some experiments this has actually been observed, the over-distended heart ceasing to beat.

The danger arises only when the drug has entered the general circulation, and is therefore much more likely to result from subcutaneous or submucous injection, than from swabbing or spraying. In the cases recorded in Dr. Levy's paper,⁴ and elsewhere, the former methods are stated to have been used in all but one instance, when spraying was done.

Whatever view may be taken of the part played by chloroform in these disasters, it can only be regarded as a predisposing and contributing cause, the adrenalin injection being the exciting and principal one.

I have no dislike to packing before, or even during, an operation for which I am giving a general anæsthetic; on the contrary, I recommend it, for not only is bleeding and consequent disturbance checked by the adrenalin, but as painful and other impressions from the periphery are reduced or annulled by the cocaine, there is less liability to shock, and by their combined action less anæsthetic is needed. I should, however, protest strongly against submucous injection, and I believe most, if not all, anæsthetists would do the same.

I am,

Yours faithfully,

J. D. MORTIMER.

12, CLIFTON HILL,

ST. JOHN'S WOOD, N.W.;

February 7, 1916.

¹ See JOURNAL OF LARYNGOL., RHINOL., AND OTOL., February, 1916, p. 40.

² E. g., *The Lancet*, July 18, 1914.

³ Hence commencing arterio-sclerosis is possibly a "protective reaction of the organism" intended to spur a heart already failing. Thus do we wander in doubt!

⁴ *Brit. Med. Journ.*, September 14, 1912.

THE
JOURNAL OF LARYNGOLOGY,
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ATROPHIC RHINITIS (OZÆNA) AND TUBERCULOSIS.

I.

BY DAN MCKENZIE.

IN December, 1910, a patient came to the Central London Throat and Ear Hospital with lupus erythematoses of both auricles. Mr. Stuart-Low, whose case it was, very kindly showed it to me, as it is, of course, unusual for lupus erythematoses to affect the skin of the ear. What interested me, however, was not so much the rarity of the site of incidence as the curious resemblance I saw in the skin disease in this situation to atrophic rhinitis in the interior of the nose: the presence of crusts, for example; the symmetry—both auricles being affected just as both nostrils usually are; the absence of ulceration; the chronicity; and, more than all, the undoubted fact that the disease had produced an unmistakable thinning or atrophy of the auricular cartilages.

It may possibly be objected that resemblances such as these are merely superficial, if not, indeed, half fanciful, and I am quite ready to admit the validity of such an objection, since, were there any direct relationship between the two, we should frequently find ozæna in the inside of the nose associated with lupus erythematoses on the outside of the nose, a combination I have never yet either seen or heard of. And yet both of these diseases are, separately, by no means uncommon affections of the organ.

It is true that in one case of long-standing atrophic rhinitis I did find several patches of this skin disease, but they were situated on the cheek and under the chin, at such a considerable distance from the nose as to negative any suggestion of direct extension from the skin to the nasal mucosa, or *vice versâ*.

But what this admittedly superficial resemblance did do was to bring to my recollection the remarkable circumstance that both of those diseases, lupus erythematoses and atrophic rhinitis, have also a deeper resemblance—a resemblance suggesting family relationship, so to speak—in that both of them are supposed to be connected in some obscure and indefinite manner with a third disease. And that third disease is tuberculosis.

Object of the Investigation.

From this accident or coincidence sprang the investigation which forms the subject of the present series of communications, and which was undertaken with the object of clearing up, as far as possible, the doubts and obscurities that to this day surround the problem of the association of atrophic rhinitis and tuberculosis.

The first doubt we have to clear up is, of course, the question of the fact. Tuberculosis may, to be sure, be found in company with atrophic rhinitis just as it may be found in company with any other disease. And so the question we have to determine, if we can, is this: Does tuberculosis appear so frequently in combination with atrophic rhinitis as to render the suggestion of mere chance coincidence an insufficient explanation of the concurrence of the two diseases?

Secondly, assuming that we are able to prove some sort of link between tuberculosis and atrophic rhinitis, our next task will be to ascertain, if possible, what is the nature of that link.

Thus the phthisis pulmonalis found in ozænatous patients may be due, as most authorities seem to believe, to the destruction by the nasal disease of the physiological functions of the nose; or, conceivably, it may attend upon atrophic rhinitis as it attends upon diabetes and some other wasting diseases; or, again, the tuberculosis may precede the ozæna, and therefore be either a predisposing cause, or actually the exciting cause of the nasal disease.

Definitions and Nomenclature.

These possibilities we shall consider in due course. But before proceeding with our inquiries there is one further preliminary

observation to be made, that, namely, which concerns the all-important question: What do we mean by "atrophic rhinitis"? Let me say at once that, for the purposes of this paper, I propose to include under this title only those cases which show atrophy of the turbinals with crust formation and objective fœtor. It is, perhaps, regrettable that the old-fashioned term "ozæna" has been almost entirely dropped by English writers, because, although syphilis of the nose was at one time included in that appellation, nowadays it is so no longer, while, on the other hand, to the name "atrophic rhinitis" different observers have come to attach widely different values, some giving that name to what others would only term "rhinitis sicca," while a few, again, seem to limit its application to such cases only as show the three distinctive features we have just mentioned. On account of this unfortunate diversity a comparison of the observations and experiments made by different workers is almost entirely out of the question, and this applies, as we shall see, with particular force to many of the statistical data.

Moreover, it has been shown over and over again that crust formation and atrophy, or at least a certain amount of atrophy, though without the characteristic fœtor, may accompany genuine lupus as well as syphilis of the nasal mucosa, while a similar condition may follow an operative clearance of the ethmoidal region in purulent sinusitis. Now, in the present investigation I propose to leave on one side all such forms of *secondary ozæna* or atrophic rhinitis—if such an epithet be permissible—and to address my inquiry solely to what appear to be cases of *primary ozæna* or atrophic rhinitis. (The terms "ozæna" and "atrophic rhinitis" I shall use in this paper as if they were synonymous.)

Post-mortem Evidence of Tuberculosis in Ozæna.

Adverting now to the first section of our subject, the question of the existence of some link or connection between atrophic rhinitis and tuberculosis, the first observation we find is that patients with ozæna not infrequently suffer from, and indeed not infrequently die of, phthisis pulmonalis. E. Fränkel in 1882 seems to have been the first to make this observation. At all events he records the fact that out of six *post-mortem* examinations made by him upon ozænatous patients, five showed old or recent signs of pulmonary tuberculosis. In the same paper in which this appeared Fränkel drew attention to the clinical fact, now common knowledge, that most patients with ozæna show a certain amount of anæmia

and deficiency in nutrition, whereby he was led to the belief that the cause of atrophic rhinitis was to be sought for in some general dyscrasia. He makes this further suggestive remark also, that in his opinion the relationship between phthisis pulmonalis and atrophic rhinitis is this: That consumptives furnish a large contingent of those who suffer from atrophic rhinitis (" . . . zur Erkrankung an Rhinitis fetida ein grosses Kontingent stellen") and not *vice versâ*.

That is to say, Fränkel's opinion was that the tuberculosis is primary and not secondary to the nasal disease. We shall return to this point later on.

Since Fränkel's time the number of *post-mortem* examinations upon ozænatous patients has gone on increasing, with the result that his findings have been broadly confirmed. According to the records in the literature, Alexander tells us, out of 22 *post-mortems* upon ozænatous patients no fewer than 15 (or 68 per cent.) were found to have died of phthisis.

Clinical Evidence.

Clinical investigation points in the same direction as pathological investigation, as Brindel in Moure's clinique at Bordeaux was one of the first to observe (in 1897). And Alexander, in the paper I have already been quoting from, reports that out of 50 patients with atrophic rhinitis he himself found definite phthisis in 22 and suspected phthisis in 7; that is to say, that 58 per cent. gave evidence of pulmonary tuberculosis. This percentage, we may say, is high compared with that of many other observers, but I believe that if the lungs in every case of ozæna were critically examined and the sputum tested for tubercle bacilli the result would surprise many who may at present be sceptical.

Evidence from Family History.

Again, if, in addition to pulmonary tuberculosis—and this is a second point of importance—we extend our inquiries so as to embrace other forms of tuberculosis, particularly with reference to the family history, we shall probably find the incidence of tuberculosis in cases of atrophic rhinitis to be even greater than Alexander's 58 per cent.

Wingrave, writing in 1894, said: "In 37 cases" out of 60 "I obtained a definite family history of phthisis" . . . "while a large number" (18) "gave a family history of suppurating glands in the neck." This is equivalent to 61 per cent. and 30 per

cent. respectively, or, if the facts referred to separate cases throughout, to 91 per cent.

Alexander indeed quotes a large number of authors who make mention of the connection of atrophic rhinitis with tuberculosis, and in most of the cases it is usually stated that there is a history of tuberculosis in the family.

Alexander himself, curiously enough, does not seem to have commented in his paper upon the family histories of his own cases, but, as the histories are given, we can fill up the gap for ourselves. The information thus obtained is significant (see Appendix I). Of 22 phthisical cases, 16 gave a family history of tuberculosis and 2 a family history of ozæna. This is, of course, no more than one might expect. But what is of much more importance is this, that of 19 cases in which a definite note is made of no pulmonary tuberculosis in the patient, 7 gave a family history of real or suspected phthisis, while 3 gave a family history of ozæna.

These last numbers, taken together with the numbers of his patients with phthisis, raise the percentage of tuberculosis patients in Alexander's cases to 72 per cent. of the whole.

Other observers give the following figures :

Clement F. Theisen in 20 cases of atrophic rhinitis found definite personal tuberculosis in 7, or 35 per cent. In one of them, besides the pulmonary disease there was otitis media with tubercle bacilli in the discharge from the ear. There is no record of the family history.

Caboche out of 39 ozæna patients found 16 with "tuberculous antecedents"—approximately 41 per cent.

Evidence from Our Cases.

The cases with which we are dealing in the present paper fall into two series : First, those which I examined myself, and second, those which I handed over to Dr. John Mackeith at the Central London Throat and Ear Hospital for examination and treatment by tuberculin.

The first list consists of 34 cases, and these were examined by me, hurriedly, I fear, as regards their anamnesis, but more particularly with regard to the von Pirquet examination, the results of which will be detailed later.

In the former examination, hasty though it was, no fewer than 20.5 per cent. showed personal clinical tuberculosis, apart from special tests and family histories. They were as follows :

Three had decided phthisis pulmonalis.

Two had suspected phthisis pulmonalis.

One had lupus.

One had tuberculous cervical glands.

The second group of cases, 13 in number, examined with greater care, the lungs being overhauled and the sputum tested for tubercle bacilli by Mackeith and Wyatt Wingrave respectively, gave the following results:

Four out of 13, or 30·7 per cent., had signs of pulmonary phthisis with tubercle bacilli in the sputum.

We must add, however, that some authors have failed to obtain similarly high figures. T. K. Hamilton, for instance, in 170 cases, found only 6 (3·5 per cent.) with phthisis. So strikingly divergent is this result from that of most other investigators that I should be inclined to ask what that author means by "atrophic rhinitis."

The Tuberculin Tests in Ozæna.

(1) *Von Pirquet's.*

The next part of this section concerns the testing of ozænatous patients with tuberculin.

In the first instance (1910 and 1911), I submitted my patients to the tuberculin cuti-reaction test (von Pirquet), but, in view of the criticisms to which this test became exposed, I abandoned it after having tested 33 cases. The results, which I give for what they are worth, are as follows:

Of 33 patients with ozæna, tested with the von Pirquet test:

Twenty-eight (*i. e.* 85 per cent.) responded positive.

Four (*i. e.* 12 per cent.) responded negative.

One (*i. e.* 3 per cent.) was doubtful.

(Three controls were tested. Of these, two were positive and one negative.)

Before going on to discuss the value of the von Pirquet test in these cases I give here the published results of other observers who have tried it in ozænatous patients.

Bilancioni in 38 patients found that—

Thirteen (*i. e.* about 34 per cent.) responded positive.

Seventeen (*i. e.* about 44 per cent.) responded negative.

Eight (*i. e.* about 21 per cent.) were doubtful.

The ophthalmo-reaction has been employed by Faracci, of Palermo. Unfortunately for our purposes he employed it in patients with "ethmoiditis" as well as in patients with ozæna, and,

in his report, he does not seem¹ to have distinguished between the two diseases. Consequently, therefore, his results cannot be regarded as throwing very much light upon the problem in so far as ozaena is concerned.

His numbers are :

Of 53 patients with ozaena and 34 with ethmoiditis, 87 in all, 47 (about 54 per cent.) gave a positive ophthalmo-reaction.

The drawback, both to the cuti- and to the ophthalmo-reactions, as tests of the presence of tuberculosis, is, as we all know, the fact that in adult life the acquired immunity, or resistance at all events, of most individuals against tubercle gives us a positive cuti- or ophthalmo-reaction whether there is, or is not, at the moment of testing, an active tuberculous focus. Consequently, in adults, very little reliance can be placed upon those tests. In infancy and childhood, however, it is generally believed that they are more trustworthy, since, in young people, acquired immunity or power of resistance has not yet been generally perfected by the presence of the bacillus. Now, ten of my patients were under fifteen years of age, and of these eight gave a positive and two a negative response to von Pirquet's test. So that, in this series, if the test is of any value in children, there was evidence of the presence of tuberculosis in 80 per cent. of the children with ozaena.

(2) *Tuberculin Hypodermic Test.*

After I had come to the conclusion that the doubtful value of the cuti-reaction rendered any further testing in this way a waste of time and energy, I varied the proceedings, and sent the patients to Dr. John Mackeith in order that he might (*a*) test them with Koch's tuberculin hypodermically—a test which is admittedly more reliable than that of the cuti- and ophthalmo-reactions; and that he might (*b*) submit those which reacted positive to the further and much more severe test of a therapeutic course of tuberculin. Of the latter we shall speak in due course. In the meantime our interest lies with the former.

Mackeith follows the rigid methods of testing and of treatment organised by Camac Wilkinson, and, although these methods may be already sufficiently well known, he is re-stating them in the paper which follows this one in order that other workers who may desire to repeat the test may be able to do so exactly,

¹ My authority is the abstract in the *Centralblatt. f. Laryng.*, the original paper not being obtainable.

and thus succeed in avoiding the confusion of results, which, as we have already seen, renders comparisons between the finding of different observers so difficult to make. In this connection, for example, Caldera, testing 60 cases of ozæna with tuberculin, obtained a positive reaction in 14 (23·3 per cent.) only. The wide discrepancy between our results and his must be due either to a difference in our conceptions of atrophic rhinitis or ozæna; or, secondly, to a difference in the mode of employing the tuberculin test.

In the 17 cases tested by Mackeith a positive reaction was obtained in all save one (94 per cent.).

The reaction affected the site of injection and the general system. And besides in several of the cases a certain amount of focal reaction was observed in the nose in the form of increase in the amount of discharge.

The significance of a focal reaction in the nose lies in this, that in the case of definite tuberculous lesions open to inspection, such as sinuses, fistulæ, and so on, a reaction after a tuberculin test-injection is to be expected at the site of the lesion; a sinus discharges more; a fistula becomes inflamed. In one of the cases referred to him, I must add, a very decided focal reaction in the nose was observed by me, but subsequently I had to come to the conclusion that this was a case not of simple ozæna, but of true lupus of the nose. It was, therefore, excluded from our lists.

We shall recur to the subject of the focal reaction in our section upon treatment by tuberculin.

It has already been noted that one, only one, of the ozæna cases tested by Mackeith gave a negative response to the test-doses, five in number in this case. A Wassermann reaction test was thereupon made by Wyatt Wingrave, with a "partial positive" result, so that in this case the nasal lesion may have been of syphilitic origin.

Summing up the results of our tests, then, I think we may say that, assuming the tests to be reliable, we found that a large majority of the cases were affected with tuberculosis. This result agrees with what we saw to be the clinical and *post-mortem* findings in cases of marked atrophic rhinitis.

Hospital Statistics.

Before concluding this section I ought, perhaps, to add that there is another source of information which at one time seemed to

me as if it might give us some guidance as to whether or not there lies a vital connection between atrophic rhinitis and tuberculosis.

In Great Britain of recent years tuberculosis has been manifesting a definite and continued diminution in frequency. It is obvious, therefore, that if there is any real connection between the two diseases our hospital statistics ought to show a falling-off also in the number of cases of ozaena. My firm personal conviction was, and is, that atrophic rhinitis is to-day both less common and less severe than it used to be, say, ten years ago. But the hospital statistics at my disposal do not bear me out in the matter. We have to contend here, indeed, with the terminological inexactitude of the expression "atrophic rhinitis."

During the early period when *ozæna* was the term employed at the Central London Throat and Ear Hospital (1884, 1885, 1886), the percentages of cases of ozaena were from 0·25 to 0·66 of all the new cases that came to the hospital in the year, whereas after 1887, when the name "atrophic rhinitis" replaced the older and more picturesque title, the percentage shot up to 2·1. And the numbers stood at high levels until 1910, when they fell to 1·3 per cent., at or about which they have since remained.

In the careful statistics of Dr. Logan Turner's clinic at the Edinburgh Royal Infirmary, "atrophic rhinitis" is divided up into the "non-fœtid" and the "fœtid," and a separate division is also provided for "rhinitis sicca"—obviously the only possible method of ensuring accuracy. The percentages relative to the number of new patients per annum since 1908 work out as follows:

	A.R. (non-fœtid).	A.R. (fœtid).
1908	1 per cent.	0·8 per cent.
1909	1·3 „	1·2 „
1910	0·7 „	1·4 „
1911	1·5 „	0·9 „
1912	0·7 „	1·1 „
1913	1·2 „	0·7 „
1914	0·7 „	1·3 „

So that there has been no change in the frequency of fœtid atrophic rhinitis among the patients attending the Edinburgh clinic during the last seven years.

These numbers are, however, of interest and perhaps of value for another reason. They show that the average percentage of ozaena cases among the patients that come to a throat and ear clinic is about 1. This piece of information we shall make use of in a later section.

Summary.

We have now reached the end of the first portion of our inquiry, that, namely, which was undertaken with the object of determining whether or no any real link or relationship could be shown to lie between atrophic rhinitis and tuberculous, other than what might be mere accident or coincidence. Let us summarise the facts for and against the existence of such a link.

For :

(1) In the majority (68 per cent.) of *post-mortem* examinations upon ozænatous patients, pulmonary tuberculosis was found to be present.

(2) Clinical examinations of ozænatous patients revealed manifest personal tuberculosis in from 20 per cent. to 58 per cent. of the cases.

(3) The family history of ozænatous patients showed the existence of family tuberculosis in from 46 per cent. to 90 per cent. of the cases.

(4) The von Pirquet reaction was positive in 80 per cent. of my cases under fifteen years of age.

(5) The tuberculin (hypodermic) test was positive in 94 per cent. of the cases tested.

Against :

(1) T. K. Hamilton found phthisis in 3.5 per cent. only of ozænatous cases.

(2) Bilancioni found that only 34 per cent. of ozænatous cases responded positive to the anti-reaction test.

(3) Caldera obtained a positive reaction with the tuberculin (hypodermic) test in 23.3 per cent. of cases only.

We have already commented upon Hamilton's results and would merely add that they are very much less than those of nearly all other observers. And with this exception it is generally agreed by the writers on the subject that ozænatous patients do frequently suffer from phthisis pulmonalis or other forms of tuberculosis, and that the taint of tuberculosis can frequently be traced in their families.

Thus the only real criticism that can be levelled against the facts favouring the belief in a link between ozæna and tuberculosis has reference to the reliability of the tuberculin tests and to the percentages of positive reactions in our testing.

The question of the reliability of the von Pirquet test we have already mentioned and discussed. Now, the discrepancy between

Mackeith's and Caldera's results in the use of the tuberculin hypodermic test (as 94 per cent. is to 23·3 per cent.) may suggest the unreliability of this test also. As to the probable reasons for this disagreement I have already expressed my opinion, and in any case we may be pardoned if we regard our own results as more valid in our eyes than the results of others, particularly when we find that our results are by no means isolated phenomena, but are facts which fall into line with the *post-mortem* and clinical data we have already given. For, however sceptical one may feel regarding the significance of these tests for tuberculosis, he is nevertheless still faced with those *post-mortem* and clinical indications of the presence of tuberculosis in the background of ozæna.

Consequently, therefore, viewing the matter as a whole, there can, I think, be no doubt that an unbiassed consideration of all the facts must inevitably lead to the conclusion that between ozæna and tuberculosis there does exist a connection, or, in other words, that the two diseases are linked together in some kind of causal relationship.

The Nature of the Link.

There are two alternatives. First, the presence of ozæna may lead to tuberculosis; or, secondly, the presence of tuberculosis may lead to ozæna.

Now, then, do the facts at our disposal enable us to decide which of those alternatives is the correct one?

Does Ozæna lead to Tuberculosis?

Although, as we have seen, not the oldest, that the nasal disease predisposes to tuberculosis is the simplest, and so far the most widely accepted theory. Indeed, it is almost universally accepted nowadays. And what can be more natural than to suppose when phthisis pulmonalis is found in an ozænatous patient that the lung disease must be secondary to the nasal disease, and due to the abolition of the normal warming, filtering, and moistening of the inspired air, together with the destruction by ozæna of the bactericidal action of the nasal mucosa? Partly, it is supposed, on this account, and partly because of the extension of the ozænatous disease process into the larynx and trachea, whereby septic bronchitis is set up, it is easier for tubercle bacilli to reach the lungs from the atmospheric air, and when they do reach the lungs it is easier for them to settle down there than it is when the upper air passages are healthy.

All the same, this theory, albeit at first sight so simple and attractive, is nevertheless open to several rather serious objections.

First of all, it fails to explain straight away the cases in which the tuberculosis affects not the lungs, but the bones, the cervical glands, or the skin. To meet those cases we may, however, assume that the tubercle bacilli are deposited in the nasal chamber and pass through the tissues to reach the glands, the bones, or the skin, as the case may be.

But the chief difficulty in believing that it is ozæna that is primary lies in the existence of tuberculosis in the ozænatous patient's family. We saw when we were discussing the family history in a former section that of 19 non-phthisical ozæna patients 7, or 37 per cent., gave a family history of tuberculosis. Now, it is easy to conceive of ozæna leading to phthisis pulmonalis or cervical gland tuberculosis in the patient himself; but, after all, ozæna in one brother's nose can scarcely produce phthisis in another brother's lungs. We must be able to point to one factor in the situation capable of governing both the patient and his family.

One explanation that might be put forward to dispose of this difficulty runs as follows: Atrophic rhinitis leads to tuberculosis; atrophic rhinitis runs in families; so that when we hear of a near relative of an ozæna patient as suffering from tuberculosis, the meaning of that is that the relative also had suffered from ozæna, and that his tuberculosis, like the patient's, was secondary to ozæna. (For a case illustrating this contention, see Appendix II, Case 3.)

This reasoning is ingenious, but as a general application unconvincing.

To begin with, while it is true that ozæna does sometimes affect two or more members of a family, I am sure that this circumstance is rare, much more rare than the tuberculosis is in these families. Alexander, for example, mentions it only 4 times in his 50 cases, and I met with it only 3 times in my 34. Again, when I have inquired into this point I have always been told, save in the single case mentioned at the end of the last paragraph, that the tuberculous relative had *not* suffered from ozæna. Now, ozæna is a disease which declares its presence so plainly to the other members of a family that if it did precede tuberculosis I am sure we should hear more about it. (See Appendix II, Cases 7 and 24.)

Thus the theory that the ozæna always precedes and predisposes to the tuberculosis is negatived by the existence of a family history of tuberculosis in so many cases of ozæna.

Does Tuberculosis lead to Ozæna?

We come next to the second possibility—that the tuberculosis is the primary disease and that it predisposes to the ozæna.

If it is the tuberculosis that is primary to the ozæna, one very important indication of that circumstance we should expect would be the frequent occurrence of ozæna in phthisical patients.

In this connection it is interesting to note that Alexander, whose paper we have been quoting from so often, had his attention first drawn to this subject by the casual remark of a physician attached to a tuberculosis sanatorium, that among his patients he had observed many suffering from ozæna. Doubtful of the accuracy of this observation, Alexander thereupon determined to investigate the matter for himself. First of all he examined 111 patients in a sanatorium for phthisis, and was unable to find a single one with true ozæna. Four patients, however, who showed signs of healed atrophic rhinitis, gave a history of active ozæna some years previously, while six showed atrophy but no other sign of ozæna, present or past. In another institution Alexander found only one typical case of ozæna, in a patient, aged eighteen, while two others, aged twenty-four and thirty-four, showed healed atrophic rhinitis. In all 200 patients were examined, and of these only 7, or 3.5 per cent., showed signs of true atrophic rhinitis. The rate being so low, Alexander concludes that phthisis cannot be a common precursor of atrophic rhinitis.

But, unless he knew the relative proportion of cases of atrophic rhinitis to the general population, such a conclusion was premature. Now, in a former section I showed that the relative proportion of ozæna cases among patients coming to a throat, nose, and ear clinic is only about 1 per cent., and when it is recalled that these are special nose patients selected from a large community, then it becomes clear that the proportion of ozæna cases in the general population must be much less than 1 per cent., and very much less than 3.5 per cent., the proportion among phthisis patients. Thus we reach, on his own figures, a conclusion diametrically opposite to that of Alexander.

In pursuance of this branch of the inquiry, I have examined a series of cases of phthisis pulmonalis among the patients attending the out-patient department of the Mount Vernon Hospital for Consumption in Fitzroy Square, London. For permission to make use of this valuable material I am indebted to the kind interest of my

friend Dr. J. Coubro Potter, Laryngologist to that hospital, and to Dr. Halls Dally and Mr. E. G. Reeve, also of the same hospital.

In all 102 patients were submitted to examination with a view to ascertaining whether they were suffering, or whether they ever had suffered, from ozaena.

The results in general were so interesting, apart from the special topic of ozaena, that I may be pardoned if I digress a little from the main line of the inquiry in order to detail them in full.

The most striking finding was the existence of simple atrophy of the inferior turbinals, which I found in no fewer than 42 out of the 102 cases, and in five of these the atrophy was extreme. It is necessary to state that this atrophy bore no resemblance whatever to atrophic rhinitis or ozaena, even when the condition was pronounced. As a rule the atrophy was most marked in the advanced cases, and I observed that, with a few exceptions, the longer the phthisis had been in existence, the more considerable was the atrophy.

This shrivelling up of the inferior turbinals is probably nothing more than part and parcel of the general emaciation of pulmonary tuberculosis.

Ten out of the 102 cases showed purulent ethmoiditis, and in two of those atrophy of the inferior turbinals co-existed with the polypoid hypertrophy of the middle turbinals.

Turning now to ozaena, I reckoned that, exclusive of doubtful and merely suspicious cases, two gave a history of ozaena in former years, while I regarded two more as being definitely the subjects of active ozaena of a mild type (see Appendix III). It is worthy of note that this number (4 out of 102 cases) is almost identical with Alexander's 3.5 per cent.

Further information on this point is necessary before we can speak with assurance, but as far as we have gone we may say that ozaena really does seem to be more frequent among phthisical patients than in the general populace.

We proceed now to deal with various other items in the general natural history of ozaena in order to see what information bearing upon the point under discussion they afford us.

Tuberculin Treatment.

We shall begin by considering the results of Mackeith's treatment of atrophic rhinitis by tuberculin, an experimental therapy which was the natural outcome of the discovery that the reaction

of an ozænatous patient to the test-dose of tuberculin was nearly always positive.

Quite apart from its bearing upon the main line of our investigation, this part of the subject is, of course, interesting from the practical standpoint of the treatment of atrophic rhinitis.

The tuberculin treatment was carried out entirely by Dr. Mackeith. As a rule, from the time I sent him the case until the course was ended, I never saw it. From the description of the treatment in his paper, the reader will see that to undertake and to carry out the long and tedious work of a course of tuberculin in as many as 13 cases, reflects great credit upon his patience and enthusiasm. The treatment calls for the most watchful care both on the part of the doctor and of the patient, and it occupies so much time that the number of cases one man can take charge of is strictly limited.

The results in the 13 cases so treated were :

Great improvement in 7.

Improvement in 3.

Improvement, followed by relapse, in 2.

Treatment of no avail in 1.

By "improvement" we mean disappearance of fætor, disappearance or great diminution in crust formation, and finally, reduction in the amount of discharge. Several of the patients volunteered the information that their sense of smell had returned or was very much improved. (Summaries of the case-histories will be found in Mackeith's paper.)

In one or two of the cases the change for the better was so great that I was tempted to use the word "cure," but experience has shown us that, although a considerable amount of improvement seems to be permanent, there is nevertheless a tendency for the cases to slip back a certain extent after the treatment is stopped. But nearly all the patients declare, even after the lapse of a year, that they are very much better than they were before the tuberculin treatment was begun.¹

With regard to the quantity of discharge a note of qualification is necessary. We saw, in discussing the effects of the test-dose, that a certain degree of what might be called focal reaction in the nose was apparent in an increase in the quantity of nasal discharge. Now, the same phenomenon was observed and noted in several

¹ Some of these patients were exhibited at the Demonstration of Cases at the Central London Throat and Ear Hospital, on the occasion of the International Congress, London, 1913.

cases during the course of the tuberculin treatment. As the course came near to its end, however, and especially after it was stopped, diminution in the quantity of discharge was noted in the cases which underwent improvement.

Not the least welcome effect of the treatment consisted in the enormous improvement that took place in the general condition of the patients. To the flabbiness and anæmia of ozænatous patients many writers have drawn attention, some of them (Fränkel, Kyle) arguing therefrom that some constitutional dyscrasia must precede and give rise to the nasal disorder. But we must remember that the constitutional symptoms may just as likely be the effect of toxic absorption from the disease areas in the nose. Such theorising apart, I have again and again been amazed at the change that followed the institution of the tuberculin treatment—pallid faces became rosy and red-lipped; languid, anæmic girls became buxom and energetic with a rapidity and completeness such as I had never before seen in ozæna with any other method of treatment. It was like the transformation in an anæmic patient after a long sea voyage. Evidently, whatever the reason may be, we had in tuberculin a tonic of extraordinary potency.

The striking improvement in the condition of the nose from the use of tuberculin may be explained in one of two ways. First, the beneficial action of the remedy upon some underlying tuberculous lesion or lesions may be responsible. Or, secondly, the general tonic effect of the tuberculin, apart from any specific influences, may lead to an improvement in the nose.

Candidly and with every desire to give due weight to possibilities other than those connected with the tuberculosis factor in the case, I must admit that something seems to happen in these cases that cannot be explained as the result of a general tonic.

Stress must be laid upon two points, however, in estimating the therapeutic (as distinct from the theoretic) value of the tuberculin treatment in ozæna. The first is that the cases, as we have seen, show a tendency to relapse after the treatment is stopped; and the second is that the method is extremely tedious both from the doctor's and from the patient's point of view.

The fact that the tuberculin treatment did not completely cure the ozæna is, of course, no reason for denying that it exercises a specific action upon the disease-process in the nose. Atrophic rhinitis must, at the best, be always difficult of cure, so profound are the pathological alterations in structure, and the distinct improvement that followed the use of the tuberculin—a result it is

impossible to gainsay—is a fact of considerable importance in our argument. It should be remembered also in this connection that tuberculin may fail to cure phthisis pulmonalis, and yet nobody would on that account be inclined to deny that that was a tuberculous disease.

Thus we claim that the results of the tuberculin treatment lend support to the belief that tuberculosis plays an important rôle in the evolution of ozæna. For, if the tuberculosis were secondary to the ozæna, the tuberculin might perhaps effect an improvement in the patient's general condition, but it could have little or no influence upon the nasal disease.

How may Tuberculosis induce Ozæna?

Our argument has now brought us to the point that ozæna is in some way a manifestation and a product of tuberculosis. There remains to be debated the question as to the method by which tuberculosis may induce ozæna.

We may say, to begin with, that ozæna is a local reaction to the toxins of the tubercle bacillus, located either (*a*) in the nose or (*b*) somewhere else in the body.

First of all, then, is ozæna due to the presence of the tubercle bacillus in the tissues of the nose?

For an answer to this question we go to the bacteriologist rather than to the histologist—if we may for a moment sunder those two offices. For, apart altogether from the microscopical characters of the changes in the tissues, if the bacteriologist informs us that the tubercle bacillus is an invariable inhabitant of the nose of ozæna, then, in view of the clinical facts we have just become acquainted with, we shall be compelled to revise our ideas of the form which the tissue reaction may take to that organism.

I have no intention of going fully into the bacteriology of atrophic rhinitis. The subject is too vast. But it is necessary for our purposes, nevertheless, to make a brief allusion to prevailing views.

Of the many organisms that flourish in the ozænatous nose, three are of importance, one of which has been, while another still is, claimed to be the *causa causans* of atrophic rhinitis. These are the Abel-Loewenberg and the Perez bacilli.

Abel first described the bacillus known by his name (or by his and Loewenberg's name) in 1893. He called it the *Bacillus mucosus*; but it is not identical with the dreaded *Streptococcus mucosus* of ear suppuration. Abel and many other

workers believed it to be the cause of ozæna, and Porter, recently, using a vaccine prepared from cultures of the Abel bacillus, reported benefit from its administration.

The Perez bacillus was first described by Perez in 1899. It is, he believes, quite different from the Abel bacillus. Inoculation experiments upon animals are reported to have produced changes in the nose resembling atrophic rhinitis in man, and Hofer, Kofler, and Brown-Kelly have tried vaccines of this organism and claim successes. According to Wingrave, however, the Perez bacillus "is a streptococcus (bacillus) indistinguishable from the cocco-bacillus coryzæ so common in our catarrhal films. It is called *fætidus* from its culture stench, and occurs in every catarrh—nasal and bronchial" (epistolary communication. See also his article later).

The Acid-fast Bacillus of Ozæna.

Thirdly, there arises for our consideration the *acid-fast bacillus* found in large numbers in the crusts of ozæna. It is a fact, of course, that the presence of this organism has long been known, but it has hitherto been looked upon as an accidental feature in the floral landscape of the ozænatous nose, most writers being careful to insist that it must not be mistaken for the tubercle bacillus. For the opinion that this acid-fast bacillus is distinct from the bacillus of tuberculosis has been long and extensively held. But, in view of the findings and considerations I have been detailing, it became evident to us that the nature of this organism should be very carefully scrutinized, and its character determined once and for all, if possible.

With this object a series of investigations and experiments with cultures and animal inoculations have been undertaken under the guidance of Wyatt Wingrave, the results of which will be detailed in a later paper. It is not my intention, nor, indeed, is it necessary for our purposes, to forestall the contents of his paper further than to say that the findings tend to indicate that the acid-fast bacillus found in ozæna may be actually a modified form of the tubercle bacillus, modified in the direction of attenuation of virulence.

I may add that for some little time past I have made it a rule, in order to test the value of the findings, to send to Wingrave for examination the nasal discharges and crusts, not only of ozæna, but also of other nasal diseases, without informing him of the source of the specimen. In the cases so far tested in this manner the acid-fast bacillus has been invariably reported in the crusts of genuine active ozæna, while it has not yet been once found by him in any other nasal disease; not even in the atrophic rhinitis following extensive sinus suppuration and operation.

One case which I naturally regarded as crucial was that of a man, aged thirty-one, with a purulent ethmoiditis which dated back to childhood. There were signs

suggestive of pulmonary tuberculosis, and the sputum contained tubercle bacilli. But no acid-fast bacilli were found in crusts from the nose.

I have obtained, on the other hand, a positive report in children as young as seven and eight years who were clinically regarded as suffering from ozæna, and I should like to record here my opinion that ozæna (atrophic rhinitis with fœtor) is a specific disease and diagnosable as such from its inception in the individual.

The acid-fast bacillus seems to be present only during the active stages of the disease. In healed cases the organism was not found.

Significance of the Acid-fast Bacillus.

Assuming now, for the sake of argument, that the acid-fast bacillus of ozæna is identical with the tubercle bacillus, the next problem to be attacked is: What influence has this bacillus upon the pathogenesis of the disease? Is it a factor in the ætiology, or is its presence a pure accident?

It must be admitted *à priori* that the presence of the tubercle bacillus is not the same thing as the presence of the disease tuberculosis. The microscopic picture of the tissues in ozæna does not show giant-cell systems. And further, Wingrave has not been able to demonstrate the acid-fast bacillus in the tissues of the ozænatous nose. It is only found in the crusts and discharges.

Having had the opportunity of removing large tonsils in a child of seven, with clinical evidence of ozæna and with acid-fast bacilli in the crusts, I sent the tonsils to Wingrave for examination. Acid-fast bacilli were not found in the tonsils—an important result in view of the fact that the tonsils may be regarded as the lymphatic glands of the nasal mucous membrane.

(This failure to penetrate the mucosa seems to be characteristic of all the organisms in the nose of ozæna.)

So much, then, may be said for the opinion that the acid-fast bacillus, even granting its relationship to the tubercle bacillus, has no influence upon the production of ozæna.

On the other side, however, there are several considerations that may be urged.

To begin with, the absence of "tubercles"—of giant-cell systems—does not absolutely negative all connection between the tubercle bacillus and certain diseases. In other diseases, recently dubbed "para-tuberculous," which we shall consider in a moment, a similar absence of giant-cell systems is remarked. That is to say that the reaction of the living tissues to this organism may assume different forms. And, if so, it is possible that one of the forms may be the lesion visible in atrophic rhinitis.

We may say for the organism that it lives in the nasal chamber, but not, so far as has been proved, within the tissues of the nose, and that, possibly, the atrophy and the metamorphosis of epithelium characteristic of the disease are due to absorption of the toxins through the mucous surface. It may be remarked that the intensity of the changes diminishes from the surface to the depths of the nasal tissues.

Animal experiments support the finding that this organism does not penetrate the tissues in ozæna. Caboche inoculated fragments of ozænatous inferior turbinals into animals, but failed to induce tuberculosis, and this negative finding I can to some extent corroborate from one or two inoculations into guinea-pigs with washed fragments of ozænatous inferior turbinals which I caused to be made a few years ago.

Other "Paratuberculous" Diseases.

Now, atrophic rhinitis is not the only disease that seems to be a satellite, as it were, of tuberculosis. Two others are known to us; one of the skin, lupus erythematoses; and one of the eye, phlyctenular, or, as it is frequently called, eczematous conjunctivitis.

Neither of those diseases shows any of the ordinary signs of tuberculosis in the structure of its lesions, any more than atrophic rhinitis shows giant-cell systems enclosing tubercle bacilli. And yet evidence is accumulating, evidence, as we shall see in a moment, of the same kind as that we have just been considering in our ozæna researches, to show that, although neither of them is tuberculous in the ordinary sense, nevertheless in both of them there are certain collateral phenomena which clearly indicate that in some hitherto unexplained fashion tuberculosis must in some way enter into their causation.

In order to display clearly and conveniently the similarity they bear in this regard to ozæna I shall detail those phenomena.

Lupus Erythematoses.

We start with the skin disease.

Stelwagen points out that more than two-thirds of the cases of lupus erythematoses are found in women between the ages of eighteen and forty, but sometimes it appears earlier than that, while children are not infrequently affected by it. He might be speaking of atrophic rhinitis !

Discussing the relationship of lupus erythematoses to tuberculosis, he says :

"In recent years there has been a growing belief that the eruption is an expression of this disease"—tuberculosis—"and the evidence accumulating and recently set forth, notably by Boeck, following that already formulated by Hutchinson, Besnier, Hallopeau, Darier, and others, has materially strengthened this view, with which my own clinical observations coincide. In more than a majority" (*sic*) "of the cases of the disseminated type reported tuberculosis or some suggestive pulmonary disease developed, rapidly leading to death. . . . In many of the ordinary clinical types variously reported tuberculous tendencies in the families of patients, or the presence of scrofulous glands or other signs of this constitutional state have been noted, and many of the cases eventually succumb to the pulmonary disease. In fact, Besnier and Hutchinson have found tuberculosis more frequently associated with lupus erythematoses than with lupus vulgaris. Sequeira and Baleau's study also show a probable tuberculous relation. Fordyce and Holden have recently reported a few instances of associated tuberculosis, and a most admirable presentation of the subject has been made by Roth, who collated about 250 cases of lupus erythematosus, and of these in over 70 per cent. there was evidence more or less pronounced of tuberculosis." (*Cf.* Alexander's percentages for atrophic rhinitis, p. 181.) "His view, in the absence so far of bacilli findings in the lesions, is that possibly the toxin generated was the causative agent, which accords with the French opinion on the subject. . . .

"It is only fair to state that many prominent observers, among whom" (are) "Dühring, Kaposi, Crocker, etc., fail to subscribe to this view, although Crocker admits the undoubted frequency of the disease in those of a tuberculous family history."

Sequeira and Baleau, in the article mentioned in this passage, found the presence of tuberculous disease in 70 per cent. of the disseminated variety of lupus erythematoses and in 18 per cent. of the discoid variety. A history of tuberculosis was made out in not less than 80 per cent.

Here, then, is a disease the actual lesions of which show neither giant-cell systems nor tubercle bacilli, the natural history of which, on the other hand, shows the trail of tuberculosis so plainly that a definite and weighty body of opinion has formed to the effect that tubercle is in some unknown way the cause of the disease. And in the absence of any clear demonstration of the nature of the link between the two diseases the suggestion is offered that the skin disease may be a manifestation of the toxins of the tubercle bacilli. The reader cannot fail to be struck with the close similarity between what we have called the collateral phenomena of lupus erythematoses and those of atrophic rhinitis.

Phlyctenular Conjunctivitis.

We advert now to the second disease, which, although it also bears no demonstrable clinical or structural resemblance to atrophic rhinitis, is nevertheless held by ophthalmologists to manifest a

relationship with tuberculosis of very much the same mysterious and yet undoubted character as lupus erythematoses or, we may say it, as atrophic rhinitis. The disease is phlyctenular or eczematous conjunctivitis.

E. Fuchs, discussing the ætiology, writes :

"Conjunctivitis eczematosa is one of the most frequent of eye diseases, and has its origin in the scrofulous diathesis. Like the latter, it is a disease of childhood and youth. In very young children—those under the age of one year—it occurs but seldom, and it generally ceases at the age of puberty." . . . "The glands at the lower jaw or in the neck and in front of the ear are swollen. . . ."

Characteristic tuberculosis of the cervical glands is common. "More profound affections that occur are caries of bone (caries of the petrous bones occurring under the form of otorrhœa being frequent), tuberculosis, . . ."

Microscopically there is round-cell infiltration with, later, shallow ulceration of the surface layers of the limbus of the cornea, and nothing else.

The following account is taken from an inquiry by Richard J. Tivnen into the relationship between phlyctenular conjunctivitis and tuberculosis. (The reader will again be struck by the interesting parallelism in detail with what we have found in atrophic rhinitis.)

Fifty cases form the substratum of his conclusions. The family history was gone into, and in 20 per cent. a history of tuberculosis was obtained. But for us the chief interest in the investigation lies in the results obtained by the tuberculin tests.

Using the von Pirquet reaction Tivnen obtained a positive reaction in 92 per cent. of cases. (Compare with my finding of 80 per cent. positive in children under fifteen with atrophic rhinitis.) Phlyctenular conjunctivitis being a disease of childhood the von Pirquet test is fairly reliable in such cases.

In addition to the von Pirquet test, Tivnen exposed his patients to a test dose of tuberculin, and obtained a positive reaction in 88 per cent. (compare Mackeith's finding of 94 per cent. in our series of cases).

Finally, he submitted his cases to the therapeutic test by treating them with tuberculin on the lines laid down by Wilkinson. The results obtained by Tivnen were : 64 per cent. permanently cured, and 26 per cent. improved.

Tivnen is convinced, therefore, that phlyctenular conjunctivitis is a manifestation of constitutional tuberculosis.

In reading over these accounts it is certainly hard to resist the conclusion that if lupus erythematoses and phlyctenular conjunctivitis depend for their occurrence upon tuberculosis, then so also does atrophic rhinitis.

A further resemblance, according to Wingrave, writing in 1894, may be seen in the similarity between the structure of lupus and that of atrophic rhinitis in its early stages. In the paper we have already referred to he writes :

"*Relation to lupus.*—Spencer Watson has advanced the view that there is a very close analogy between atrophic rhinitis and lupus non exedens, and that they may both be due to a common bacillus. That they probably possess a few features in common may be correct, but the suggestion of a common origin in a particular bacillus requires some substantiation ere it can be accepted, even admitting that lupus has a specific organism. Atrophic rhinitis, like lupus, is undoubtedly a spreading disease—it may extend to all the accessory and adjacent cavities, it may even involve the larynx—but it has never crossed the muco-cutaneous boundary. It occurs, like lupus, chiefly in patients who are the subjects of a tuberculous or strumous taint, and it tends to persist, but not to kill. In its fundamental histological features—the presence of small cell tissue of a low type—it resembles lupus and tubercle, but it does not ulcerate spontaneously; its end is sclerosis.

"Lupus has been described as an attenuated form of tuberculosis. Are we, then, to consider atrophic rhinitis an attenuated lupus? There is certainly a sufficient resemblance between these diseases, both histologically and clinically, to justify further investigation."

Summary and Conclusions.

The several conclusions we have arrived at in the course of our long investigation may be summarised as follows:

(1) There is *post-mortem* evidence of the frequent association of tuberculosis and atrophic rhinitis (ozæna).

(2) There is clinical evidence of the same (*a*) in the personal history and status of the ozænatous patient; (*b*) in the family history.

(3) Our tuberculin tests showed active tuberculosis in the majority of our cases of ozæna.

(4) This was supported by the phenomena and results of the tuberculin treatment.

(5) There is some evidence tending to show that ozæna is commoner in patients with phthisis pulmonalis than in the general community.

(6) There is evidence tending to show that the acid-fast bacillus of the ozænatous crusts is an attenuated variety of the tubercle bacillus.

(7) Ozæna resembles in many of its details other "para-tuberculous" diseases.

Taken by itself any one of those data would arouse little or no interest in our minds, but when they are summed together their cumulative effect is, in my opinion, overwhelming.

It is true that there are a certain number of cases of ozæna in which all efforts to find the tuberculous element seem to be vain. But experience has shown that the more assiduously this element is sought for, the more frequently will it be found.

With regard to the rump of the cases, those in which all tests fail (I have yet to find one in which the acid-fast bacillus is absent!), we may either ignore them as Mott did the apparently non-syphilitic cases of tabes when he was arguing from the statistical evidence that that disease was syphilitic; or else we may suppose that there may be two or more types of ozæna; in other words, that there may be two or more organisms that produce the clinical phenomena, the symptom complex of typical ozæna.

But the final conclusion to which Mackeith, Wingrave, and I have come as the result of our prolonged investigation is that *ozæna, as we see it in England, is a manifestation of tuberculosis.*

Practical Importance of the Subject.

Apart from the great interest aroused by the theoretical side of this subject, we should not fail to appreciate also its practical importance. A knowledge of the part played by tuberculosis in ozæna considerably modifies our views on the prognosis of the latter disease. Further, that all patients with ozæna should be submitted to regular examination of the lungs and of the sputum should obviously become a clinical rule of the first importance.

In conclusion, I have to express my most grateful thanks to Dr. John Mackeith for the interest he has taken in the work, to Dr. Wyatt Wingrave for information and advice upon the histology and bacteriology of ozæna, and to my colleagues on the staff of the Central London Throat and Ear Hospital for kindly supplying us with material.

Appendices.

I.—*Alexander's Case Histories, summarised (to show the tuberculous family histories in patients personally free from tuberculosis).*

CASE 1.—Phthisis pulmonalis suspected.

CASE 2.—Phthisis pulmonalis diagnosed.

CASE 3.—Phthisis pulmonalis diagnosed.

CASE 4.—Phthisis pulmonalis diagnosed.

CASE 5.—Lungs normal.

CASE 6.—Phthisis pulmonalis. One brother suffered from "cough."

CASE 7.—No lung disease in the patient. But parents and all three brothers and sisters of father died of phthisis pulmonalis. No more disease in the family.

CASE 8.—No lung disease in the patient. The mother suffered from atrophic rhinitis.

CASE 9.—Phthisis pulmonalis diagnosed. Mother died of phthisis.

CASE 10.—Phthisis pulmonalis suspected. An uncle died of phthisis.

CASE 11.—No lung disease in the patient. A brother with atrophic rhinitis.

CASE 12.—Phthisis pulmonalis suspected. Father suffered from atrophic rhinitis.

CASE 13.—Phthisis pulmonalis. Only brother died of phthisis. Patient had lupus of the right cheek five years previously; operated on and cured.

CASE 14.—Patient, aged sixty-eight, had bronchitis and slight emphysema. *Not phthisis pulmonalis. Mother died of phthisis. Father suspected of phthisis (hæmoptysis). One of four sisters died of laryngeal phthisis. Of her eight children, one died of phthisis.*

CASE 15.—*No lung disease in the patient. Two brothers died "of their lungs."*

CASE 16.—Phthisis pulmonalis diagnosed. One sister died of phthisis.

CASE 17.—*No lung disease in the patient. No record of tuberculosis in the family.*

CASE 18.—Phthisis pulmonalis diagnosed in the patient.

CASE 19.—Phthisis pulmonalis diagnosed. Age of patient, eighteen years. Mother phthisical.

CASE 20.—Phthisis pulmonalis suspected. Father died of phthisis.

CASE 21.—Phthisis pulmonalis diagnosed. One brother phthisical.

CASE 22.—*No lung disease in patient. No family history of tuberculosis reported.*

CASE 23.—Phthisis pulmonalis diagnosed. Father and one sister died of phthisis. A niece with atrophic rhinitis.

CASE 24.—*No lung disease in patient. No family history of tuberculosis reported.*

CASE 25.—Phthisis pulmonalis diagnosed.

CASE 26.—Phthisis pulmonalis diagnosed.

CASE 27.—*No lung disease in the patient. Atrophic rhinitis in mother and sister.*

CASE 28.—*No lung disease in patient. One sister died of phthisis, and of twelve in family only four survived.*

CASE 29.—Phthisis pulmonalis suspected. Father died of phthisis.

CASE 30.—Patient manifested a "bronchitic residuum of old pneumonia." No family history of tuberculosis reported.

CASE 31.—*No lung disease in patient. One sister suspected of phthisis.*

CASE 32.—*No lung disease in patient. No family history of tuberculosis or atrophic rhinitis reported.*

CASE 33.—*Patient showed "residuum of old pneumonia" (not tb.). One brother died of phthisis.*

CASE 34.—*No lung disease in patient. No family history of tuberculosis reported.*

CASE 35.—*No lung disease in patient. No family history of tuberculosis reported.*

CASE 36.—Phthisis pulmonalis diagnosed. No family disease.

CASE 37.—Phthisis pulmonalis diagnosed. Mother and one brother phthisical.

CASE 38.—Phthisis pulmonalis diagnosed. Aged eighteen. Mother phthisical.

CASE 39.—Phthisis pulmonalis suspected. No family disease reported.

CASE 40.—*No lung disease in patient. No family disease reported.*

CASE 41.—Phthisis pulmonalis diagnosed.

CASE 42.—Phthisis pulmonalis suspected. Sister with atrophic rhinitis.

CASE 43.—Phthisis pulmonalis diagnosed. Mother, mother's father, and all seven of her mother's sisters and brothers died of phthisis.

CASE 44.—*Lung disease, not phthisis, in the patient. One brother died of phthisis. One brother had hæmoptysis.*

CASE 45.—Phthisis pulmonalis diagnosed. One brother and one sister phthisical.

CASE 46.—Phthisis pulmonalis diagnosed. One sister "serofula" in youth; cough since.

CASE 47.—*No lung disease in patient.* No family history of tuberculosis reported.

CASE 48.—*No lung disease in patient.* No family history of tuberculosis reported.

CASE 49.—Phthisis pulmonalis diagnosed.

CASE 50.—Phthisis pulmonalis diagnosed. Mother phthisis (?).

Notes on above Cases (D. M.).—Nineteen cases not phthisical; of these, 5 gave a decided and 1 a suspicious family history of tuberculosis; 1 with "residuum of pneumonia" gave a family history of tuberculosis; this making 7 in all. In 3 of these non-phthisical cases there was a family history of ozæna. Thus of the 19 cases without pulmonary tuberculosis, 7 showed a family history of real or suspected tuberculosis, while 3 gave a family history of ozæna.

Further, of the phthisical cases 16 gave a family history of tuberculosis and 2 a family history of ozæna.

II.—Cases tested by the von Pirquet Reaction (by D. M.).

CASE 1.—D. H——, female, aged eighteen. Incipient A.R. Cuti-reaction = markedly +.

CASE 2.—G. C——, female, aged fifteen. A.R., chiefly in naso-pharynx. Cuti-reaction = +.

CASE 3.—A. G——, male, aged twenty. Dev. septum to left. A.R., chiefly on left side. Cough and expectoration for twelve months. Sputum = No. B.T. Lungs: Suspicious of phthisis. Cuti-reaction = +. *Family history:* Father had A.R., and died of phthisis at age of forty-one.

CASE 4.—A. P——, female, aged sixteen. Cuti-reaction = + severe.

CASE 5.—A. C——, male, aged forty-five. A.R. Chronic laryngitis, with t. acheal crusts. Cuti-reaction = +.

CASE 6.—Mrs. W——, aged fifty. Tertiary syphilitic infiltration of larynx. Also A.R. nose. Cuti-reaction = negative. (? Nasal condition syphilitic.)

CASE 7.—E. I——, female, aged thirteen. Severe A.R. since a child. (*Family history:* Father died of phthisis two months before birth of patient. One of nine children. The eldest son is "delicate": suspected phthisis. Another son has discharge from nose like the patient. Two daughters have died; one of phthisis. Another daughter with phthisis still alive. The father had no trouble in the nose. My informant, the mother.) Cuti-reaction = negative. Tuberculin reaction + (see Case 8, Mackeith's series).

CASE 8.—A. K——, female, aged twenty-three. Deviated septum. A.R. Chronic suppuration middle ear. Cuti-reaction + marked.

CASE 9.—R. R——, male. A.R., not severe. Cuti-reaction = +. Lungs: Deficient R.M. at right base. Suspected phthisis. (Control: T. II——, male, aged eleven. Cuti-reaction = negative.)

CASE 10.—E. W——, female. A.R., three years' duration. Cervical glands enlarged, which began to get small after testing. Cuti-reaction = + excessive.

CASE 11.—J. S. S——, male, aged twenty-three. A.R. Cuti-reaction = +.

CASE 12.—G. W——, female, aged twenty-one. A.R. for five years. Cuti-reaction = +.

CASE 13.—F. G——, male, aged twenty-five. A.R.: Cuti-reaction +.

CASE 14.—W. G——, female. A.R.: Cuti-reaction = doubtful. (Control: Mrs. M——, aged twenty-six. Cuti-reaction = +.)

CASE 15.—M. S——, female, aged nineteen. A.R. Atrophic pharyngitis. Cuti-reaction, negative.

CASE 16.—Mrs. F——. A.R. for ten years. Cuti-reaction = doubtful.

CASE 17.—B. B——, female, aged twenty-three. A.R. Chronic suppuration of middle ear. Cuti-reaction = +.

(Control, A. W——, male, aged eighteen. Cuti-reaction = + marked.)

CASE 18.—L. P——, female, aged fifteen. A.R. Cuti-reaction = negative.

CASE 19.—F. C——, male, aged twelve. A.R. Cuti-reaction = +.

CASE 20.—W. F——, male, aged nineteen. A.R. for three years. Cuti-reaction = +.

CASE 21.—H. H——, male, aged twenty. A.R. ever since he began school. Atrophic pharyngitis and laryngitis. Cuti-reaction = +.

CASE 22.—D. W——, male, aged twelve. A.R. marked. Cuti-reaction = +.

CASE 23.—N. J——, female, aged sixteen. A.R. Cuti-reaction = +.

CASE 24.—E. S——, female, aged twelve. A.R. since age of two years; fœtor then noticed. Cuti-reaction = +.

CASE 25.—M. T——, female, aged seven. A.R. *Family history*: Mother died of phthisis three years ago. No sign of A.R. in the mother. One of nine children, thirty to twelve years. All healthy but second boy, who is asthmatical. "Stiff breathing" noticed soon after birth. Fœtor first noticed a year ago. Cuti-reaction = +.

CASE 26.—V. W——, female, aged twelve. A.R. for four years. Cuti-reaction = +.

CASE 27.—E. O——, female, aged eighteen. A.R. for three years; mild. Cuti-reaction = +.

CASE 28.—M. H——, female, aged twenty-three. A.R. for five years. Chronic laryngitis for three months. Anæmia. Consolidation right pulmonary apex Phthisis pulmonalis. Cuti-reaction = +.

CASE 29.—F. M——, female, aged nineteen. A.R. incipient. Cuti-reaction = +.

CASE 30.—J. C——, male, aged thirteen. A.R. for six years. Cuti-reaction = +.

CASE 31.—B. P——, male, aged ten. A.R. Cuti-reaction = + excessive.

CASE 32.—A. B——, female. A.R., fœtor. Cuti-reaction +.

CASE 33.—D. S——. A.R. Cuti-reaction +.

III.—Cases of *Phthisis Pulmonalis* giving evidence of past or present *Ozæna* (D. M.) (The cases are numbered as they occur in my list.)

CASE 14.—G. W. T——, male. Phthisis pulmonalis and tuberculosis of larynx of two years' duration. *Nose*: No history of A.R., but there is distinct atrophy, especially on the left side of the nose, which is roomy from a deviated septum to the right. Appearances suspicious.

CASE 38.—C. P——, female, aged ten. Delicate from birth. *Nose*: No history. Atrophy marked with crust formation, but no fœtor. Father phthisical.

CASE 45.—M. J——, female, aged seventeen. Phthisis pulmonalis. *Nose*: Objective fœtor; crusts and atrophy (ozæna).

CASE 48.—C. S——, female, aged forty-eight. Phthisis pulmonalis of four years' duration. *Nose*: History of crusts and fœtor when she was a young woman. But no atrophy or crust formation at present seen.

CASE 53.—R. H——, male, aged forty-two. Phthisis pulmonalis of three years' duration (advanced). *Nose*: Crust formation for years, and "uses a handkerchief

a lot." But "no bad smell" at any time. On examination, atrophy of the inferior turbinals with much general mucopurulent secretion. Crusts in the posterior regions of the nose and on the posterior wall of the naso-pharynx. Ozæna posteriorly.

CASE 66.—E. S.—, female, aged thirty-seven. Phthisis pulmonalis. Cavity in apex. Nose: Always had purulent discharge from the nose. At the age of thirteen there was objective fetor. On examination mucopus seen posteriorly in the ethmoidal region. No crusts. Marked turbinal atrophy with glazing of the surface. Pharynx normal.

CASE 78.—Mrs. R.—, aged thirty-six. Phthisis pulmonalis for many years ("since childhood"). Nose: Subject as a young woman to "colds," with "irritation" and crust formation, with subjective fetor. On examination simple atrophy seen; no crusts; no fetor.

Notes.—The above list comprises 7 cases out of the 102 examined by me at the Mount Vernon Hospital for Consumption. Of these 7 I regard 2 (Cases 45 and 53) as ozæna; 2 as suspicious (Cases 14 and 38—the latter probably incipient ozæna); 2 (Cases 48 and 66) gave a definite history of ozæna, now no longer present; and 1 (Case 78) a doubtful history.

Excluding the "doubtful" and "suspicious" cases, this gives 2 cases with active ozæna, and 2 with extinct ozæna; or 4 in all out of 102 cases.

None of the cases were examined for the acid-fast bacillus.

In this connection I am indebted to Mr. Reeve for the observation that among 250 phthisical male patients at one time under his care he noticed, without making any search for the disease, that 3 of the patients were the subjects of ozæna.

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FIBROMA OF THE NASO-PHARYNX: A FURTHER NOTE ON THE OPERATIVE TREATMENTS OF THE SAME.

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IN the July, 1906, number of this Journal my paper on the removal of naso-pharyngeal fibroma by enucleation appeared. I believe I can claim that it was a departure from methods up till that time in use, and I am still of opinion that the main principle of the method of operating there described is the best so far devised.

The modification described by Dr. Thomas Guthrie in the November, 1915, number skilfully avoids any external scar. In my cases, all of whom were males, the external incision, being made in the lines of the face, left so trifling a scar that after a short time it was hardly noticeable.

From time to time I have read discussions on the operative treatment of these growths, and only occasionally has the method of enucleation been referred to. Dr. Guthrie does me the honour to refer freely to my paper. His remarks on the paragraph where I speak of "a well-defined capsule from which the tumour may be enucleated, the capsule being formed of a firm layer of the pharyngeal aponeurosis," show the necessity of accuracy in language and in the use of terms so as to avoid being misunderstood. If I had described the tumour as being situated under a firm tentorium of fibrous tissue formed by a layer of the pharyngeal aponeurosis it might have made my meaning clearer. There is nothing in the nature of a complete encapsulating membrane. The tumour in its growth lifts the membrane up and pushes it in front of it during its growth. The membrane is intimately adherent to the tumour in all parts where the latter is not attached to the bone. Guthrie states that his specimens do not show greater vascularity

in the peripheral than in the central portions of the growth. This is probably anatomically correct; still I have always found that the moment of the greatest hæmorrhage was when, having separated the tumour from its bony attachments, I proceeded to tear it away from its investing membrane.

More lately I adopted a method of controlling the hæmorrhage during the operation, which in difficult cases may be of service. I had a fibroma to operate on which elsewhere had been several times attempted. I knew that adhesions would make a rapid operation impossible. I had noticed my colleague, Sir Herbert Maitland's, practice in some of his jaw operations of applying a temporary clamp on one or both common carotids. He kindly assisted me in this case by applying a temporary clamp on the common carotid on the side where the fibroma had its principal attachments. The hæmorrhage was markedly less than usual, and I was able to proceed without hurry. This additional step in the operation is worthy of consideration. Maitland's clamp is a modification of Crile's forceps. By applying it on both carotids there would be practically no hæmorrhage. Maitland has used the clamp on both common carotids with safety in a large number of jaw operations. Maitland's clamp is encased in soft rubber to avoid injury to the coats of the vessel.

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

February 4, 1915.

President: DR. J. W. BOND.

Tumour in Region of Right Tonsil and Soft Palate.—J. W. Bond.—Patient, a woman, aged fifty-two. A painless swelling in region of right tonsil was noticed about six months ago, and it has since increased in size. The fauces are almost completely obstructed by a smooth, round swelling, covered by mucous membrane, and with a definite border all round. The mass is attached on the right side, and extends from the hard palate above to below and behind angle of jaw, where it can be felt externally. Posteriorly it extends to back of lateral pharyngeal wall. It is slightly movable. No tonsil proper can be seen.

I think it would be well if we could have more statistics as to the

results of operation in this region. We know that the prognosis of epithelioma seems bad, but we do not know the prognosis of adenomata, endotheliomata, and the varieties of sarcoma. I think the tumour can be enucleated.

Extensive Scarring of the Face.—**J. Edmond.**—This patient, a man, aged twenty-seven, suffered from ulceration in the region of the nostrils, which began twenty years ago. During the next fifteen years the lesions were twice curetted, and he had several prolonged courses of treatment by Finsen light and X rays. Five years ago the ulcers rapidly healed after medicinal treatment (presumably by potassium iodide and mercury). Can anything better be done to conceal the deformity?

The PRESIDENT: This seems to be a case of ancient syphilis, with bad damage to the nose. I had a case very much like it some years ago; several operations which I performed did not do much good. Finally, a nose was made from the forehead. It is not necessary to attempt that in this case; I think some plastic operation is possible.

Dr. KENT HUGHES: I think a good deal can be done for him by lifting up a central portion from the upper lip, and putting an epithelial graft on the other side of that. It makes a very good columella, as pointed out by the late Sir Henry Butlin.

Fish-bone in Œsophagus, followed by Abscess in Neck.—**Norman Patterson.**—Patient, a woman, aged forty-four, came to the London Hospital on August 12, 1915, complaining of a pricking sensation on the left side of the throat. She said that two days previously a fish-bone had stuck in her throat. She was examined with mirror and Œsophagoscope—no bone discovered. Next day a fish-bone about 1 in. in length (specimen shown) was brought up. Two days later (August 15) a swelling was noticed in the neck, occupying the position of the left lobe and isthmus of the thyroid. The swelling increased in size, and extended upwards till, by August 20, the whole of the left side of the neck was swollen. On the afternoon of that date, as the patient had some dyspnoea, the house surgeon made an opening in front of the sterno-mastoid, but failed to find pus. The patient was seen by the exhibitor the same evening, and examination of the larynx showed swelling behind the left arytenoid, some swelling of the arytenoid itself, and impaired movement of the left vocal cord. Under a general anaesthetic a free incision was made behind the sterno-mastoid, and a large abscess evacuated. A tube was left in for two days. Recovery was rapid and uneventful. The pus contained a variety of organisms.

The PRESIDENT: I wonder where the bone could be when not found by Œsophagoscopy or other examination. In recent cases a bone can generally be found, but I always doubt about cases which have gone on for several weeks: in my experience we do not find them.

Mr. TILLEY: Recently I missed a portion of a pheasant's bone in the gullet. When one gets below the cricoid region, where the Œsophagus enlarges, it is easy for a bone to lie in the folds of mucous membrane and to be missed by the Œsophagoscope. I withdrew the instrument carefully while watching the posterior wall, and I did not think the bone was there. A pledget of wool was inserted to remove some secretion, when it caught in something, and on removal the bone was adherent to the wool. It is easy to pass the Œsophagoscope over a coin in the same region of the gullet without seeing the foreign body.

Sarcoma of Naso-pharynx and Cervical Glands; Result of Treatment.—Norman Patterson.—The patient, a woman, aged thirty-nine, came to the Hospital for Diseases of the Throat, Golden Square, in July, 1913, complaining of discharge of mucus and blood from the nose and throat, and inability to breathe through the nose. The whole of the naso-pharynx was filled by a mass of new growth which projected nearly down to the free edge of the soft palate. It was soft to the touch and bled profusely after digital examination. There was some enlargement of the glands in both anterior triangles.

September, 1913: The patient was referred to Dr. Sequeira for X-ray treatment. After six applications through the mouth the growth had entirely disappeared. At a later date a tube of radium was inserted into the post-nasal space, although by this time the tumour had completely vanished. In spite of eight applications of X rays to the neck, the glands continued to enlarge. Operations on the neck were carried out on the following dates: June 26, 1914: Dissection of right anterior triangle. July 29, 1914: Same procedure carried out on the left side. On this side there were enlarged glands deep to the sterno-mastoid, which were removed after section of the muscle.

February, 1915: An enlarged gland had appeared on the right side above the clavicle. A thorough dissection was made in this neighbourhood after turning outwards a triangular flap of skin; one incision was made along the line of the clavicle and the other down the anterior border of the sterno-mastoid. Microscopic examination of one of the glands showed mixed-celled sarcoma. Since the last operation the patient has had several applications of X rays. There is now no sign of recurrence. The patient is somewhat deaf on the right side. There is a history of discharge from the right ear in 1912, which lasted a week.

The PRESIDENT: The result in this case seems to be a very happy one, owing to the utilisation of the various forces which we now have at command. At one time such cases would have been left alone.

Partial Excision of the Thyroid Cartilage as an Alternative to Thyrotomy in Malignant Disease of the Vocal Cords.—H. Lambert Lack.—The patient, a man, aged fifty-five, had an epithelioma involving the greater part of the right vocal cord, only the extreme ends being free. The specimen and microscopical section are shown; also a larynx dissected to illustrate the method of operating.¹

I performed this operation in my earliest thyrotomies, but subsequently adopted the usual method. Latterly I have reverted to it. In my opinion it has many advantages. Better access means an easier, more rapid, and more thorough operation. The removal of the underlying cartilage certainly aids in thoroughness. The easy control of bleeding means less trouble with the anæsthetic and less danger of blood entering the lungs. Should packing of the wound be considered necessary, it is much easier to introduce it and later to remove it. It does away with the necessity of splitting the thyro-hyoid membrane and the violent pulling apart of the two halves of the thyroid, which often leads to much subsequent discomfort and difficulty in swallowing. In my next case I intend to go further. I shall try not to split the thyroid cartilage in its whole extent, but to leave a small piece in the middle line quite at the top (see specimen shown). In this way the operation, although more thorough than thyrotomy, will be as simple

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., April, 1916, p. 121.

and as free from danger as tracheotomy. Moreover, if the growth crosses the middle line in front, it can still be removed in one piece without cutting into it, this advantage being emphasized in my original account of the operation.¹ In this paper the risk of cell transplantation from cutting into a growth, and the advantages of avoiding it, were especially considered. Also, occasionally, the bared piece of cartilage necroses and leads to considerable delay in healing. After this operation healing seems to take place more quickly.

With regard to the voice, I think the results may be even better than after thyrotomy. If the soft parts are removed right down to the cartilage one cannot expect much granulation tissue to spring up, and in some of my cases a large gap has resulted, with a very poor voice. After removal of portions of the cartilage and, in one case, of half the larynx, a better voice has been obtained than is usual in thyrotomy, and in much less time. Members may remember the historical case of Montagu Williams, whose voice after hemi-laryngectomy was so good that there was thought of his returning to the Bar, and he did fulfil his duties as a police magistrate for several years subsequently. I expect, therefore, this method to yield better ultimate results than thyrotomy.

The PRESIDENT: Twenty-two years ago Mr. Lambert Lack helped me with a laryngeal case, when I removed a large part of both thyroid plates, leaving the posterior and superior borders. I also removed the cricoid. I am glad there has been a development of this operation of laryngo-fissure or thyrotomy. At a late meeting I stated there was difficulty in obtaining a proper view of the diseased part in these cases. The operation now described by Mr. Lack will give one a better view of the region from which the growths spring, and especially of the posterior part. Mr. Lack also mentions the risk of cell transplantation due to cutting into the growth, and I sure that is a decided risk. Of late years in these cases I have always used the actual cautery, because one gets the knife and the wound tainted, and cauterizing the wound lessens the risk of recurrence.

Sir STCLAIR THOMSON: I think Mr. Lack's object is a very worthy one, because, as we said in a debate here not long ago, one difficulty of laryngo-fissure is getting to the posterior end of the cord, both for seeing and for dissecting it off, as well as for dealing with possible hæmorrhage. And, as I mentioned at the time, I sometimes get a better opening than some of my colleagues, by semi-dislocating the larynx on to the spinal column in order to be able to look at it sideways and lift one of the alæ. By so doing, I have not had such great difficulties as one would imagine. Mr. Lack's suggestion is only suitable in certain cases. Anyhow, it is not suitable for cases which go across the middle line, unless one is prepared to take a bit of the thyroid cartilage on the opposite side. And it is difficult to know, before you have split the larynx and opened it as widely as possible, what is the extent of the growth you may have to deal with. So I do not regard this as an "alternative" to laryngo-fissure; it can only be an "addition." I think it wise to split the larynx first, because no method of laryngoscopy ever tells one exactly the extent of the growth. In some of these cases I have had to pare off the growth into the subglottic region, and although these cases generally show that the growth is too far gone, still, I have had two cases in which I have had to split the cricoid cartilage in order to get into the subglottic region, and the patients have lived for years afterwards. The simpler

¹ See *Lancet*, 1896, i, p. 1638.

an operation is, the more perfect it is likely to be; and it is only when new that operations are complicated. At the beginning laryngo-fissure was complicated by many things which we have now got beyond. There is the Hahn's tube, which Mr. Lack still uses. I have used it, but I am glad I said "Good-bye" to it ten years ago, because it was a very unsatisfactory method of cutting off the blood from the lower air passages. It had to be carefully prepared with a sponge, which was very difficult to keep aseptic; moreover, one had to wait for it to dilate and so block the trachea. The only case of pneumonia I ever had was after one of these tubes had been used. By the simpler method of packing with gauze or a sponge from above, one can be absolutely certain that no blood goes into the lung. During the last ten years I have had no trouble with these cases, excepting in one in which there was difficulty of swallowing; all the other patients could swallow in twenty-four hours. The exception was the case of a man, aged sixty-eight, who had sclerosed arteries and was alcoholic, and he had to be fed through the nose for ten days. This method of Mr. Lack's, though very elegant and giving a view far back, would still entail the splitting of the thyroid cartilage at the top if one wished to go as far above and below as might be necessary. Therefore, though it might be suitable for some of the more limited cases, those are just the cases in which one would not require it.

Mr. TILLEY: I have not practised the operation now under discussion; but one gathers from the demonstration that there are advantages in connection with it when the growth is small and limited. It would be possible to remove a small nodule on the cord in this way. But in each case upon which I operate I feel more and more strongly that we cannot take away too much of apparently healthy tissues around the cancer. In my last patient I cleared out all the tissues, from the top of the thyroid to the cricoid ring, though the growth was only a small nodule. I am quite prepared to hear someone say that was unnecessary, but the proof will depend on the after-history of a series of such cases. At the last meeting I showed a case of recurrence, seven years after the primary operation; the nodule was situated in the lower part of the remains of the ventricular band, which had been left at the operation seven years previously. Now if I had taken the precaution to remove the apparently healthy tissue from the whole inner surface of the thyroid, probably there would not have been a recurrence. Mr. Lack's procedure seems to me to be well conceived, and it might be applicable to a small growth; but if I adopted the method I should take out the whole side of the thyroid cartilage, and should not limit it to a small window. I hold this opinion as the result of some experiences in recurrence after the lapse of a long period of time—*e.g.* thirteen and fifteen years after the primary operations. I do not think you can make too wide a removal of tissue in these laryngeal cases or in cancer in any other region. With regard to Hahn's cannula, I use it merely as a convenient form of tracheotomy tube, but it has no sponge coating, and when I insert it I pack a long strip of gauze above it and proceed at once with further steps in the operation.

Dr. BROECKAERT, of Ghent (speaking in French): Two years ago for the first time I demonstrated in Paris a method which is somewhat between a thyrotomy and a hemi-laryngectomy. One striking thing about the two cases was the ease of the post-operative treatment. I bring the skin over, and close the wound at once. I introduced it to Dr. Moure, of Bordeaux, who was satisfied with it and carried it out. I

also introduced it to a Dutch colleague, Dr. Quix, who modified it slightly by turning in a flap of skin from the side, so as to line it with a graft. I call it a window excision of part of the larynx. It is very important to leave the upper and posterior borders of the thyroid wing, a point which makes the great difference between this operation and hemilaryngectomy, which I, like others, have found to be an even more fatal operation than complete excision of the larynx.

Dr. KELSON: I would like to ask Mr. Lack one question. He says in his notes: "I performed this operation in my earliest 'thyrotomies,' but subsequently adopted the usual method." I ask why he abandoned that method.

Mr. LACK (in reply): I am sorry I mentioned Hahn's cannula. I pointed out in the *Lancet* twenty years ago that it was impossible to rely on it, and that it was necessary to pack the trachea above it. This has invariably been my practice, although I still generally use a Hahn's cannula, as it is convenient for the anæsthetic. The criticism of Sir StClair Thomson and Mr. Tilley is based upon a misapprehension, perhaps because in the specimen I dissected only a very small window is cut. In my description, I state that all the cartilage which in the usual operation of thyrotomy is laid bare by removing the mucous membrane inside the larynx should be cut away. The amount of cartilage removed corresponds with the amount of soft parts removed, and this may be as extensive as the operator desires. As Prof. Broeckaert showed, the whole thyroid cartilage, with the exception of the upper edge and the posterior edge, may be removed as well as half the cricoid. The removal of the cartilage, by giving better access, allows a more thorough operation and the removal of a more extensive growth than a simple thyrotomy. Whether or not it is advisable to split the thyroid as a preliminary does not affect the principle of the operation, which is the removal of the cartilage as well as the soft parts.

Total Laryngectomy for Cancer, Three Years after Operation.

—Dan McKenzie.—The patient was shown before the Section on March 7, 1913. The operation took place on January 12, 1913, having been preceded by tracheotomy fourteen days before. Novelties in the technique consisted, first in the treatment of the trachea, the upper end of which, after division, was closed with catgut sutures while the tracheotomy tube was left in the tracheotomy opening. Three weeks after operation the upper end of the trachea began to gape, and the tracheotomy tube was removed from the tracheotomy opening and inserted into the upper end of the trachea, allowing the tracheotomy wound to close.

The interval during which the upper end of the trachea remained closed was that during which wound discharges are most liable to cause pulmonary complications. It is to this precaution that the rapid apyrexial recovery of the patient is attributed. There is now, three years since the operation, no sign of any recurrence. The cervical glands, none of which could be felt on palpation, were not removed.

The PRESIDENT: Would it not be practicable to insert a tube upwards, and so improve the voice?

Leukoplakia of Vocal Cords.—Herbert Tilley.—The patient is a stout, healthy-looking male, aged fifty-two. He complained solely of hoarseness, but in reality it was a gruffness of his normal voice. No

history of syphilis. Wassermann reaction negative. On the right side of the tongue there was a small smooth patch suggestive of chronic superficial glossitis. No other stigmata of syphilis in the throat or elsewhere. The vocal cords were slightly congested but freely movable. From the middle of the upper surface of each cord, and extending to within $\frac{1}{4}$ in. of the anterior commissure, a dead white patch could be seen, in appearance identical with the plaques seen in a leukoplakic tongue. The surfaces of the plaques are flat, and there is no suggestion of ulceration, thickening, or infiltration of the cords in the neighbourhood of the white patches.

The fact that both cords are affected, and that they are normal in the immediate region of the anterior commissure—*i. e.* that the plaques are not continuous—would seem to negative the idea of their being an early stage of epithelioma, and the term "leukoplakia" has been given because the appearances are so like that condition when seen on the tongue.

The PRESIDENT: There is more growth on the left cord than on the right, and an interval between without growth; there is some flagging of the left cord, and there the growth goes down some distance. The diagnosis seems to rest between malignant disease and tubercle. At present no one can say what it is with certainty, and the case must be watched.

SIR STCLAIR THOMSON: I should not like to make a diagnosis. The cords are abraded, and one may be ulcerated; and there is on both of them this white sloughy membranous secretion, which Mr. Tilley says he has brushed off and it has returned. It may be some infection from the nose or some local suppurative infection. As it is on both cords, tubercle seems more probable than malignant disease.

MR. STUART-LOW: I had a case like this sent to me from South Africa; the patient had the same condition on one vocal cord. The late Sir Henry Butlin once sent round some statistics relating to the spread of infection from one cord to the other, and asked us to give him details of our experience of the process.

MR. TILLEY (in reply): I show the case here because I think I have not seen one exactly like it before. The man is strong, stout, and perfectly healthy. He has no physical signs of tubercle, and there is no history of syphilis; the Wassermann test is negative. Beyond the slight gruffness of his voice, which he has had for eighteen months, there is no other symptom. On the right side of the tongue we found a smooth patch which suggested chronic glossitis, and he has therefore been having, since December 4, 10 gr. iodide of potassium three times a day and $\frac{1}{16}$ gr. of perchloride of mercury in solution. He says he is better, and that his throat and voice seem better; but I cannot detect any difference in the laryngeal appearances. I show him because of the possibility of early malignant disease. While he has been under my care I have had under my notice a medical man whose somewhat similar laryngeal appearances have puzzled me very much; but they were limited to the right vocal cord. Some fifteen years ago he suffered from a digital chancre, and two years later I saw him with a gumma under his right Eustachian tube. Six years after that, in spite of different courses of treatment, he comes with this patch on the right vocal cord, which I took to be a recrudescence of his old trouble. But injections of grey oil and iodide of potassium internally did not result in its disappearance. I wondered whether it was early epithelioma. The condition disappeared after a week's vocal rest. The patient shown to-day cannot take

a week's vocal rest. I could not convince myself that there was any deficiency in the movement of the left vocal cord. I think I shall let the case run a little longer, keeping an eye on him; and if I find any sudden increase in size of the patch, or evidences of infiltration, I shall operate at once. In answer to Sir StClair Thomson, I have rubbed that patch twice with nitrate of silver, and it is adherent. I do not think it could be wiped off or that the epithelium could be removed with forceps.

Case of Hypopharyngeal Carcinoma; Removal; Restoration of the Wall by Turning in a Piece of Skin.¹—W. M. Mollison.—

The PRESIDENT: We are glad to see cases of this rare operation, and hope this case will be more successful than the original series reported by Mr. Trotter. No cure was recorded in his five cases. I should like to see this patient again at the end of a year, if she is then alive.

Dr. DUNDAS GRANT: Mr. Waggett showed a similar case here one or two years ago, and I do not think he reported any recurrence in it. I do not think he turned in a flap of skin, a very admirable part of the operation in this case. I am particularly interested in this condition, because it was I who suggested it should be made a subject of discussion at the last International Congress—*i. e.* post-cricoid carcinoma. It had been forced upon my attention by the fact that I had seen several cases in remarkably young women, a surprising fact considering that we had been brought up, as it were, on the idea that carcinoma of the larynx in women was very rare. It has now become a very important chapter in laryngeal surgery. Such cases as this encourage us.

Mr. CYRIL HORSFORD: I have a similar case of pharyngeal cancer, in the lateral wall, very early and limited, except that it is now beginning to encroach on the larynx. There is no palpable gland, and I thought it would be suitable for Mr. Trotter's method of lateral pharyngotomy. But the prognosis in this class of case is so bad that one hesitates before advising such a severe operation. I ask whether, after his experience, Mr. Mollison can say my case is likely to be capable of being dealt with satisfactorily by his method.

Mr. MOLLISON (in reply): I brought the patient forward so soon after operation because of the interest of such cases, and to emphasise the comparative ease of the operation under intra-tracheal insufflation of ether; this does away with the necessity of tracheotomy beforehand, and the tube in the larynx does not get in the way after opening the pharyngeal wall. I dissociate these hypopharyngeal cases from pharyngeal cases; they are usually women between thirty-five and forty years of age. I undertook the operation in this case because the history was comparatively short—only four months—though doubtless the ulcer had been there some time previously; also she had a long thin neck, which made the operation comparatively simple. I followed Mr. Trotter's method, as described in his Hunterian Lectures, but found I had to remove the lateral lobe of the thyroid gland to get low enough to reach the lower edge of the ulcer. Then one could remove the whole wall of the hypopharynx and strip it off the back of the cricoid, leaving only a narrow strip of mucous membrane to make continuity of the upper with the lower parts. The turning in of the skin was comparatively easy; when it was fixed in position a tube was passed from the mouth through the œsophagus to the stomach; on its removal at the end of three days

¹ See JOURNAL OF LARYNGOL., RHINOL., AND OTOL., April, 1916, p. 129.

the junction was quite water-tight, and at no time since the operation has any food come through.

Plastic Operation for Nasal Stenosis.—**W. Stuart-Low.**—Patient, a soldier, wounded at the battle of Ypres four months ago, received a very severe injury to the nose, which was quite flattened, the bones of the septum being crushed and the *alæ* forced down flat. He underwent repeated operations in the military hospitals in order that a nasal passage might be re-formed, and when he was sent to the Central London Throat, Nose, and Ear Hospital, the anterior nares were quite obliterated by cicatricial compression. Moure's operation was performed. The right *ala* having been freed and the soft structures towards the inner canthus turned up, passages were then bored out in the flattened tissues, and a long inner tracheotomy tube placed in them. This was found very useful indeed in maintaining the opening, as its flange prevented it passing in too far. Soft catheters were then passed twice daily into the passages and naso-pharynx and out at the mouth, and these were pulled see-saw fashion for five or ten minutes at a time. The catheters were greatly enlarged, and now No. 12 is used. This was found very effectual in maintaining and enlarging the passages, which are now good. He can breathe quite freely, even at night.

Naso-pharyngeal Fibroma—**F. A. Rose.**—A boy, aged twelve and a half. A swelling has been noticed in the left cheek for seven months. There has been bleeding from the nose upon about twenty different occasions. A smooth, firm, rounded tumour fills the left side of the naso-pharynx and the posterior part of the left nasal fossa. A portion of the growth projects below the malar bone. The left eye is proptosed.

The PRESIDENT: I suppose the question here is as to the best method of approach. I am not now so inclined to use the mouth operation as I used to be. In this case I would do something like Moure's operation as a beginning, and then go further down if necessary, from the upper part of the maxilla and through the alveolar process, so as to get a good exposure of the growth through the front of the face. It may be possible for Mr. Rose to operate through the mouth and secure a good result, though I doubt it. We could not very well palpate the growth to define its limits posteriorly.

Dr. KELSON: It is doubtful whether it is a simple naso-pharyngeal fibroma. It seems more like certain malignant cases which one sometimes sees.

Dr. JOHNSON HORNE: I attach importance to the site of origin of the growth being determined before its removal. So far as I have been able to examine the case the growth appears to me to be antral and not naso-pharyngeal in origin.

Dr. KENT HUGHES: I palpated this case in the hospital and I do not think it is naso-pharyngeal; I think it arises from the antrum. It is prominent in the nose and adherent to the septum and turbinate; there is proptosis and a fulness above the zygoma. I doubt whether it is simple fibroma.

Plumbism and Pyorrhœa associated with Passive Œdema and Thickening of the Uvula, Epiglottis, and Arytænoids, with Enlargement of the Glands in the Parotid and Submaxillary Regions.—**Jobson Horne.**—The patient, a man, aged fifty-seven, is a sanitary fitter. For thirty-one years in this occupation he has been

working with red and white lead and paint. On September 1, 1915, he came to the Metropolitan Ear, Nose, and Throat Hospital on account of deafness, and mentioned that there had been some "swellings in the neck." Eighteen months previously he had attended on account of "closing of the throat." At that time it was noted that the uvula was enlarged and the arytenoids were œdematous, but no enlargement of the glands was recorded. Upon further inquiry it was ascertained that he had had similar throat symptoms at intervals before his first attendance at the hospital.

Towards the latter part of November, 1915, there was a recurrence of the "swellings" about the neck, and in January of this year he attended again at the hospital. There were then, on the left side, three obvious swellings, one over the parotid and two at the angle of the jaw, of the size of damsons, discrete and free from pain or tenderness; another and similar swelling, but less obvious, was symmetrically situated over the right parotid region. The teeth and gums were in a very unhealthy condition—tartar, pyorrhœa, gingivitis, together with a faint blue line. The uvula was enlarged almost to the size of the tip of a little finger, the epiglottis was considerably thickened, obscuring a complete view of the larynx, but the arytenoids were seen to be enlarged. The voice was natural, but there was some difficulty in swallowing. Twenty-one years ago the patient was laid up for thirteen weeks with pneumonia. Examination of the lungs and heart yielded nothing abnormal. There was no sputum and no cough. There was no history of any specific disease nor of tuberculosis. There were no enlarged glands palpable other than those mentioned. The glandular enlargement was probably due to local causes. The treatment given was quinine (1 gr.) and iodide of potassium (5 gr.) thrice daily, and a mouthwash of peroxide of hydrogen. Within ten days there was instantaneous and marked improvement, the "swellings" rapidly subsided, and the patient expressed himself as feeling decidedly better.

MR. CLAYTON FOX: I think it is probably primary tuberculosis in the upper deep cervical and parotid lymphatic glands. The condition of the uvula is certainly not tuberculous, but there is some infiltration of the epiglottis without œdema. I regard the œdema of the uvula and arytenoids as secondary to lymphatic obstruction.

DR. DONELAN: I noticed that the œdema of the epiglottis has almost disappeared, doubtless as the result of treatment. The œdema of the uvula and the glandular enlargement are still present. I was unable to detect any evidence of tuberculosis in the larynx.

DR. JOHNSON HORNE (in reply): The possibility of the lesions being due to tuberculosis has been kept in mind, but so far no clinical evidence has been obtained to support the suggestion. Moreover, as there has been such a remarkable subsidence in the glands and reduction in size of uvula and epiglottis after ten days of treatment with iodide of potassium (5 gr.) internally and peroxide of hydrogen as a mouthwash, I am all the more inclined to associate the condition with plumbism.

Intense Dryness of the Mouth, associated with Ulceration of the Pharynx.—Cecil Graham.—Female, aged forty-six, noticed loss of voice, suddenly, towards the end of November, 1915. She had pneumonia four months previously, but was well during the interval preceding the loss of voice. She has no moisture in the buccal cavity, the mucous membrane being perfectly dry; and superficial furrows are seen on the tongue which are formed by the papillæ and which do not

extend into the substance of the tongue. The pharyngeal wall is coated by sticky mucus, and shows superficial ulceration from the naso-pharynx to the arytenoids. The vocal cords are pink and fleshy, and their close apposition is prevented by inter-arytenoid thickening. The left nasal fossa is clear, and the maxillary sinuses are translucent, but there is some inspissation secretion, small in amount, in the right middle meatus.

Dr. DUNDAS GRANT: I think the condition of the larynx was secondary to the nasal suppuration, the swelling in the inter-arytenoid space being due to infection by the inhaled pus. The vocal cords are red rather than infiltrated; that may be secondary to the dry mouth and to the crusts in the nose. I do not know what is the cause of the dryness of the mouth.

Dr. KELSON: I think this patient's urine should be examined; the case reminds me of appearances seen in diabetes.

Sir STCLAIR THOMSON: The appearance suggests that something has been going on for some time, because in the inter-arytenoid region there is that chronic hypertrophy which is generally associated with the descent of pus from the nose or with a late syphilitic manifestation.

The PRESIDENT: This afternoon Mr. Graham has received an intimation that the Wassermann reaction is positive. There has doubtless been purulent rhinitis for years and a secondary atrophic rhinitis with descending atrophic trouble.

Chronic Syphilitic Laryngitis with Marked Stenosis.—William Hill.—Man, aged thirty. Primary syphilis contracted ten years previously. Severe tertiary ulceration and deformity of larynx one year ago, necessitating tracheotomy. Portions of hyperplastic tissue have been freely removed through an endoscope, but stenosis has speedily recurred. Patient cannot breathe well through an ordinary intubation tube, showing that the upper end of the trachea is also stenosed. It has been found impracticable to use a Schimmelbusch apparatus through the present ordinary tracheotomic orifice, and in view of the syphilitic nature of the lesion, with the tendency to contraction, the exhibitor has hesitated to resort to any further cutting operation. Suggestions are invited as to any other treatment.

Dr. DUNDAS GRANT: I suggest he should try Thost's dilators, which are passed from below upwards. The horizontal limb of the plug goes underneath the tracheotomy tube; they are graduated and can be used one after the other. Possibly after reopening the larynx one could again do the laryngostomy.

Lupus of the Mouth and Throat.—W. Kent Hughes.—Patient, a female. There is a large nodule on the side and under surface of the tongue, divided into two by pressure upon the second bicuspid (left lower). The under surface and extremity of the tip have now a granular surface, but until recently were occupied by a large flat nodule. The left side of the lower jaw is extensively involved in the region of molars and second bicuspid. The epiglottis has almost disappeared, but the disease in this region is quiescent.

I am not responsible for the diagnosis of lupus; the case was sent to me by Mr. Harmer. This is about the only pest which does not luxuriate in Australia; I have not seen an instance there. Five years ago the woman had occasional loss of voice, and four and a half years ago she noticed that her epiglottis was affected, next the lower part of the base

of the tongue, then the tip of the tongue, lastly the jaw. Three years ago she came under Mr. Harmer's care, and he gave her tuberculin, and that improved the larynx and base of the tongue, but had no effect on the anterior side of the tongue or the jaw. Then 60 gr. sodium iodide by ionisation was tried, twenty applications, and she has had forty applications of the Simpson lamp. That was last November, and I did not see her again until a fortnight ago, when she was steadily becoming worse; therefore I decided to try the effect of Spengler's I.K. therapy. I have had only a small experience of that treatment, but it has been so striking in the person of my wife that it seemed worth trying in this case. Spengler advised it in lupus and tubercle, and the result has been most surprising in a fortnight, the tongue condition having half cleared up in that time, and the girl eats better and feels improved in every way. On testing by Spengler's precipitation test, which he admits is only a rough-and-ready method, an enormous improvement in the patient's resistance is seen. My wife's case was a most striking one: she had been "going down hill" for seven years, and at one time had twenty bacilli per field (that was last October); now she has only one bacillus in five fields, she is putting on weight, and in the last ten weeks her temperature has only once been above the normal.

The PRESIDENT: With regard to lupus of the throat, nose, larynx, etc., in my experience one falls into the pit now and then if one fails to have a Wassermann test carried out and carefully done. I have seen many cases diagnosed as lupus when the condition was syphilis, and *vice versa*.

Mr. HUGHES: Wassermann's reaction was negative.

Abstracts.

PHARYNX.

Roy, Dunbar. — Partial Paralysis of the Soft Palate following Removal of Tonsil and Adenoids. "Laryngoscope," 1915, p. 361.

The writer has apparently had his nerve somewhat badly shaken by an unfortunate result of removal of adenoids and tonsils. The patient was a male, aged four, who was operated on on May 20, 1913. Complete enucleation was accomplished without trouble, and "with less traumatism than usual." Two days later there was no pain in the throat, but a week after that the child was brought back with a history of fever (101° F.), malaise and inability to articulate distinctly. On swallowing, liquids returned through the nose. Examination showed the pharynx to be in good condition—both pillars appearing normal. The tongue was coated. The child was given small doses of strychnine, and later the naso-pharynx was irrigated with alkaline lotion and touched with argyrol. Within ten days the temperature subsided and the patient was able to swallow better, but the soft palate still had a leathery look. Within the next month the voice was practically normal.

Roy gives it as his opinion that operations for the removal of tonsils and adenoids should not be looked upon as a simple procedure, but should have the same thought and care "as any other major surgical operation." Within the last few years Roy has seen various mutilations of the pharynx caused by the so-called tonsillec-tomies. The anterior and posterior pillars are often united into one flat cicatrix, and in many

cases the movements of the palate are markedly restricted. Roy has also seen stripping of the mucous membrane from the soft palate and total ablation of the uvula. He thinks that the case reported above may have been due to injury to the muscles of the soft palate during the removal of adenoids, and holds that an unnecessary amount of force and traumatism is frequently used in this operation. It is very easy to over-stretch the soft palate even by a digital examination of the naso-pharynx. In the present case Roy used a small-sized Brandege's forceps for the removal of the adenoids, but since then he has abandoned forceps. He believes that the La Force adenotome is a good instrument, and follows this with a small Gottstein curette.

So much has been written, especially in the secular periodicals, concerning the ill effects of adenoids, that parents now make their own diagnosis. If one were to credit all that is written on this subject, mothers would soon believe that their offspring would become raving idiots if their adenoids were not removed. Roy holds that every young child has adenoid tissue in the naso-pharynx, and even if a child is a habitual mouth breather it by no means proves that he has a large mass of adenoids. The parent or physician who thinks that the removal of adenoids will cure all symptoms of mouth breathing in every case will be sadly disappointed. Mouth breathing is often due to a short upper lip associated with a high-arched palate. In these cases the work of the dentist is needed to widen the palatal arch.

According to Roy, a swift operation on the naso-pharynx, frequently with the palate obscured by blood, is by no means an infrequent occurrence among the best of us. Many of these cases are never seen again, and it is therefore impossible to know the end result. The cases should be kept under observation.

Roy has circularised fifty-five specialists in the United States on the question of paresis of the palate following operation, and has received answers from thirty-nine men. Opinions were almost equally divided, about half the specialists denying any knowledge of paralysis of the palate. (This group included Kerrisen, Kyle, Loeb, McKernon, Sluder, Stein, Harmon Smith, and Yankauer.) On the other hand, Ballenger has seen a few cases of partial and total paralysis, in all of which regurgitation through the nose was present. Barnhill has had several, while Beck finds that about 10 per cent. of private cases have a nasal twang after operation. Hurd has seen a number of cases in which the soft palate was so much deformed and so rigid as to appear immobile. Hudson Makuen has observed one case of almost complete paralysis of the soft palate following digital examination.

J. S. Fraser.

NOSE.

Cooke, Robert A. (New York City).—The Treatment of Hay Fever by Active Immunisation. "Laryngoscope," 1915, p. 108.

Any form of foreign protein introduced within the living body gives rise to the formation of a specific immune or antibody which exists either attached to certain cells or free. When union takes place between protein and free antibody there is no clinical evidence of reaction, but when a union takes place between protein and fixed antibody a reaction takes place. When there is a large excess of antibody circulating free we have an immune state, and when there is little antibody, and that for the most part attached, we have the sensitised state (anaphylaxis). We do

not know why certain individuals become and remain sensitised, though we know that the capacity is largely inherited (64 per cent. of cases).

In America hay fever occurs in two well-defined groups of cases—(a) the Spring type, beginning May 1 to 15 and ending July 15 to 30, (b) the Fall type, beginning August 10 to 20 and ending October 1 to 15. The early and late types are due to different kinds of grasses. The diagnosis may be made by means of the cutaneous reaction. Solutions of pollen protein injected intra-dermally give rise almost at once, in individuals sensitised to that protein, to the formation of an urticarial weal surrounded by a distinct zone of hyperæmia and usually attended by considerable itching of the skin. Practically all hay fever cases show multiple sensitisation, *i. e.* they react positively to more than one protein. Ten per cent. of cases have both spring and autumn symptoms, while 32 per cent. have sensitisation to different proteins, *e. g.* cat, egg, lobster, celery, etc. The clinical manifestations may be urticaria, asthma, angio-neurotic œdema, hay fever, and gastro-enteritis. The pollens of the *Graminaceæ* are by far the most important in the early cases.

Preparation of the Pollen Extracts.—Dried pollen is ground in a mortar with sand, using N/200 NaOH + 9 NaCl solution. It is then shaken for twenty-four hours and afterwards filtered through sand and then through a sterile Berkefeld filter. Doses are expressed in fractions of a milligramme of nitrogen content.

Treatment.—The intra-dermal tests have first to be applied in order to determine the specific etiological factors in the case. Prophylactic treatment is begun about two months before the anticipated attack. Injections are given subcutaneously at weekly intervals, the dose at first being very minute and gradually increasing at subsequent injections. Ten or twelve injections in all are required. On the other hand, cases that present themselves for treatment during the attack are given minute doses on four successive days, and then at intervals of from three to five days. Cooke gives some illustrative cases: Female, suffering from late hay fever, which started sixteen years ago; no asthma. Shell-fish produced an intense itching of the entire skin. Intra-dermal test: Rag-weed and Golden-rod both positive. Treatment: Ten injections, after which the patient was entirely free.

Cooke admits that cases once rendered immune do not, as a rule, retain a sufficiently high degree of immunity to protect them during the ensuing year. Out of sixty cases there was marked improvement in 60 per cent., some improvement in 30 per cent., while less than 10 per cent. were failures. It is more difficult to obtain immunisation in the late type of infection. In conclusion Cooke utters a word of caution against the liberal use of this form of treatment in highly sensitised individuals, especially asthma cases, as alarming symptoms are apt to arise and death from anaphylactic shock is not impossible.

J. S. Fraser.

Meyer, A. W.—Sinister Unrecorded Anomalies of the Sphenoid. "Annals of Otology," xxiv, p. 257.

Describes two specimens in which diverticula of the mucous lining of the sphenoidal sinuses protruded directly into the subdural space. One case was aged twenty-eight, the other thirty. Sphenoidal sinusitis in either would probably have resulted in meningitis; whilst probing, irrigation, or other operative procedures would have resulted disastrously through no lack of skill or foresight on the part of the operator. Such anomalies must be rare.

Macleod Yearsley.

ŒSOPHAGUS.

Richmond McKinney (Memphis, Tenn.)—Simple Inflammatory Stenosis of the Œsophagus. "Laryngoscope," 1915, p. 354.

Hitherto, strictures of the gullet have been classified into: (1) malignant; (2) traumatic; and (3) spasmodic. Simple inflammatory stenosis has not been recognised, though, according to McKinney, such a condition may at times endanger life. It is best to make the œsophagoscopy examination without the aid of cocaine, which causes blanching and retraction of the tissues. The commonest symptom of simple inflammatory stenosis is regurgitation of food. There is no pain, but, should the stricture continue long enough, there is loss of weight. The treatment consists in gradual dilatation applied through the œsophagoscope, no anæsthesia being necessary. Guisez says that the œsophagus may become completely stenosed under the influence of irritation and of simple chronic inflammation. He finds that inflammatory stenoses occur at the contracted extremities of the gullet; they may be due to two causes: (1) Simple thickening of the wall following œsophagitis due to chronic irritation, indigestion, or alcohol; (2) spasms terminating in permanent stenosis. Stasis of food following upon the spasm causes inflammation of the œsophageal wall, which results in cicatricial degeneration. The initial spasm occurs in patients who eat rapidly and masticate poorly. The condition is to be differentiated from cardio-spasm, since the latter condition causes hypertrophy of the œsophageal musculature, with subsequent atony and dilatation, but does not cause a true organic and annular stricture. McKinney believes that there is always a primary œsophagitis in organic inflammatory strictures, the œsophagitis being due to localised irritation. McKinney records the following cases: Case 1.—Male, aged sixty-two, with increasing dysphagia for eight months. The food seemed to be arrested in the upper portion of the gullet, and was frequently regurgitated. The patient was a rapid and hearty eater, and suffered from indigestion. Œsophagoscopy showed an annular stricture at the mouth of the gullet, through which McKinney could pass an 8 mm. tracheal tube. The stricture was 24 cm. from the incisor teeth. There was no pouching of the hypo-pharynx. The stricture was dilated by flexible bougies and a cure was obtained. Case 2: Male, aged sixty-five, dysphagia for one year; food lodged in throat and slowly went down. No loss of weight, but the patient had bad teeth and indigestion. Œsophagoscopy showed a constriction at the mouth of the gullet which yielded to gentle pressure with a linen bougie, size 15 F. At the end of one month a size 40 F. was passed without difficulty. Simple œsophageal strictures are not transitory; when they once begin they continue gradually to grow worse. They are not due to hysteria. McKinney holds that it is comparatively easy to exclude cancer as the simple strictures are annular, attended by no pain, and are easily treated. Guisez has seen twelve cases of inflammatory stenosis, six of which occurred at the cardiac end. McKinney's cases number four, and in all the cervical region was affected. He finds that the area of constriction is always more deeply congested than the part above. Dilatation should be practised with extreme care for fear of rupturing the wall of the gullet. This accident occurred in a case of McKinney's, in which the stricture was caused by the accidental swallowing of concentrated lye. During the writer's absence the patient was removed from his wards by a general surgeon who attempted reversed dilatation through a gastric fistula. The patient died within twenty-four hours. *J. S. Fraser.*

MISCELLANEOUS.

Kahn, H., and Gordon, L. E.—The Use of Pituitary Extract as a Coagulant in Injury of the Nose and Throat. "Annals of Otology," xxiv, p. 322.

The authors tabulate fifty cases and conclude: (1) The coagulation time of the blood is materially reduced by the hypodermic administration of pituitary extract. (2) The hæmorrhage following nasal and throat operations is much reduced, especially those on the turbinal body. (3) The effect on the blood-pressure of children is variable, as follows: Systolic pressure was increased in 55.31 per cent. of the cases, reduced in 36 per cent., and unchanged in 8.5 per cent. Diastolic pressure was increased in 35.5 per cent., reduced in 35.5 per cent., and unchanged in 29 per cent. Pulse-pressure was increased in 61 per cent. and decreased in 39 per cent. The method of administration followed was to give 12 minims hypodermically to children and 15 minims to adults, not less than fifteen minutes before the intended anæsthetic.

Macleod Yearsley.

 REVIEWS.

Diseases of the Nose and Throat. By JONATHAN WRIGHT, M.D., Director of the Department of the Laboratories, New York Post-Graduate Medical School and Hospital, and HARMON SMITH, M.D., Surgeon to Throat Department of the Manhattan Eye, Ear, Nose, and Throat Hospital; Clinical Professor of Laryngology and Rhinology, Cornell University Medical School. Illustrated with 313 engravings and 14 plates. Pp. 683. London: Baillière, Tindall & Cox, 1915.

As a combination of forces nothing could surpass the co-operation of Dr. Jonathan Wright and Dr. Harmon Smith in the presentation of the pathological and clinical aspects of diseases of the throat and nose. Dr. Jonathan Wright has been so long known to the older generation of laryngologists as a zealous and original investigator that it might have been thought that his time for retiring from work had arrived. The frequent appearance of fresh contributions from him prove that he is still active, and a visit to him in his laboratory in New York enables one to judge that he is likely to continue his contributions for many years to come.

The book is emphatically a good one, and every article has some distinctive feature about it. Dr. Harmon Smith is essentially practical, and has evidently got his ideas thoroughly clarified as the result of much thought and observation. We find, therefore, that many of the chapters contain in a concise form an extraordinarily complete account of any given branch of the subject. This will be evident to anyone who reads the accounts of distortions of the septum or of the diseases of the accessory sinuses. The essentials which are of most use to the young specialist are to be found shorn of the less relevant elaboration and repetition which are apt to confuse him. The older specialist also can scarcely fail to find many points of fresh interest either from their actual newness or from the new manner in which they are presented.

The tonsils afford much material for the pathologist and the clinician,

jointly and severally, and the joint efforts are attended here with the best result. The writers modestly disclaim any pretension to settle the "functions" of the tonsils, but their description and analysis of "certain bio-physical and bio-chemical reactions recognised as part of the activities of the lymph-glands on the surface of the pharynx" are most illuminating. They consider that there is every clinical reason to believe that pathogenic bacteria find entrance to the general lymphatic system and blood-vessels through the tonsils as portals of entry. The varying direction of passage of different objects (bacilli, ear-mine granules, etc.) is explained to some extent by differences of surface-tension. Much seems to depend on the integrity or otherwise of the lining membrane of the crypts. The retrogression of the lymphoid tissue of the naso-pharynx and pharynx and its bearing on treatment are interestingly discussed. Sound rules are laid down as to whether, when, and how to operate. The chapter on naso-pharyngeal tumours is, of course, one of the most important, and runs on practical rather than on logical lines; that is to say, that naso-pharyngeal growths of naso-pharyngeal origin and of nasal origin are considered together. We think, however, they might well receive separate notice, and that their treatment varies in very essential details when the diagnosis is once established. The methods of removal are "rhinologically" considered, but we think the raspatory operation for the genuine naso-pharyngeal fibroma ought to be firmly established. The relative non-vascularity of the cortex and attached base of the growth as compared with the interior was well illustrated by Irwin Moore's report of the appearance in a section of such a growth (Roy. Soc. Med., Laryngol. Sect., 1914). This observation explains the satisfactory results obtained from the raspatory operation.

The nasal septum and the accessory cavities of the nose are dealt with in the same discriminating manner.

Among the most striking points in the section on the larynx we note the very judicious remarks on singers' nodules, though when it is stated they may be "as large as a full-grown pea, 1 cm. or more in diameter, but they often are smaller than a grain of wheat," we think something more than typical "singers' nodules" has come into the category. The advice to avoid operation on the typical "nodules" until Curtis's exercises have been tried (p. 491) is, in our opinion, absolutely sound.

We have nothing but praise for this excellent work.

Dundas Grant.

Diseases of the Throat, Nose and Ear. By WILLIAM H. KELSON, M.D., B.S., F.R.C.S.(Eng.). Pp. 270 + xv, with 89 illustrations. London: Frowde and Hodder & Stoughton, 1915.

The work under review adds yet another to the list of special text-books. The author states in his preface that it has been thought best to omit from the text nearly all reference to authorities as being incompatible with the smallness of the book. As a book for general practitioners and senior students it is adequate, since it gives full descriptions of procedures which, however minor they may be from the specialist's point of view, require accuracy in performance. Major operations, likely to be practised only by the specialist, are dismissed with brevity. Two points require supervision when a second edition is called for: the use of the galvano-cautery and the prevention of deafness. As regards the former, there is a growing feeling amongst many rhinologists that the galvano-cautery is used far too frequently and with

too little consideration as to the future and function of the nose. In the second case, it will not be long before any text-book on diseases of the ear will be reckoned as out of date and failing in its duty if it does not seriously consider the question of the *prevention* of deafness and ear disease.

Macleod Yearsley.

OBITUARY.

DR. JOHN O. ROE.

(Rochester, N.Y., U.S.A.)

AMONG the names of foreign laryngologists which have been household words to us from our youth up is that of "Dr. John O. Roe, of Rochester." The list of Active Fellows of the American Laryngological Association shows that he was admitted to that august body as far back as 1879. On running my eye down the list I see there are only three names senior to his. He gained his Fellowship early, and maintained his reputation to the end, chiefly by his fine work on nasal deformities and obstructions. This work he gave to the profession in numerous articles, and it is no unkindness now to say that they were worded so obscurely that it was very difficult to follow his directions! In fact his writing was so involved that, as I once jokingly remarked, it reminded me of the story of a German professor, long resident in this country, who was wont to say, "I understand Hegel when he no understand himself." I never saw Dr. Roe operate, but the illustrations of his patient's noses "before and after" demonstrate sufficiently his skill as a cosmetic surgeon, and I believe he enjoyed a large practice. This, indeed, is a department of practice to which our younger brethren, who may be sighing for fresh fields to conquer, might well turn their attention; for the work of John O. Roe in America and of Halle and others in Berlin shows what can be done nowadays.

Dr. Roe was descended from an English family who had settled in Rhode Island as far back as 1640. He was born in 1849, and graduated from the University of Michigan in 1870. He started practice in Rochester in 1873, and as he devoted himself to diseases of the nose and throat from his early years, he gained the distinction of admission to the American Laryngological Association within nine years of qualification. He was well known on this side, and worked with Morell Mackenzie at the Throat Hospital in Golden Square. He was a frequent attendant at congresses and meetings, and we were all glad to see him at the gathering of the British Medical Association in Toronto.

He was stricken with pernicious anæmia whilst still in the full activities of practice.

His works are well worth studying.

DR. MOREAU ROBERTS BROWN.

Dr. M. R. Brown died after a protracted illness, at his home, Winnetka, Illinois, March 14, 1914. He was born in Texas, 1853, qualified in 1876, and, like so many laryngologists, commenced his professional career as a general physician. In 1881 he determined to devote himself to special practice, and studied in Göttingen, Munich, Vienna, and under Sir Morell Mackenzie in London. In 1886 he established himself at Chicago, where he soon earned for himself an election to the Fellowship of the American Laryngological Association.

DR. JOSEPH SCRIBNER GIBB.

Dr. J. S. Gibb was born in Philadelphia in 1859, and after graduating in 1880 he practised general medicine for ten years. In the early 90's he devoted himself to laryngology and was a regular attendant and contributor at the meetings of the American Laryngological Association. He died on November 2, 1914.

DR. SAMUEL WOOD LANGMAID.

Dr. S. W. Langmaid died in Brookline, Mass., on February 3, 1915, in his seventy-eighth year. He was able to trace his descent from pure British stock who had come from England in 1635. He was a Bostonian by birth and by education, and entered Harvard, where he graduated in 1864. It was not till 1882 that he gave up general surgery for diseases of the throat. He took great interest in music, and this, and a love for fishing, brought him many friends outside the medical circle. Several of his articles were devoted to such subjects as "vocal culture" and "vocal disability." These, and his article on "The Effects of Tobacco upon the Throat" (published in the *Transactions of the American Laryngological Association* in 1904), commanded considerable attention. He was a good type of cultured Boston specialist.

DR. CLINTON WAGNER.

Dr. C. Wagner, of New York, died at Geneva, Switzerland, a few months after the outbreak of the European war. His family had been settled in Maryland since 1667, and he was born in Baltimore in 1837. He graduated just before the beginning of the American Civil War, and was present at the battle of Gettysburg and many other engagements. He remained on in the Army Medical Corps until 1869, when he came to Europe to devote himself to the study of laryngology. Establishing himself at New York he soon acquired a leading position, and was one of the earliest to describe and practise thyrotomy. He retired from practice several years ago and spent much time in travel. He will be remembered as one of the pioneers of American laryngology.

StClair Thomson.

CORRESPONDENCE.

To the Editor of THE JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY.

SIR,—In reply to Mr. Mark Howell's letter, dated November 29, 1915, regarding the removal of a slice of skin from the upper border of the retro-auricular flap, I can only say that I had no intention of claiming originality for this procedure, nor for using the bit of skin as a graft. Both these procedures, however, were original as far as I was concerned—that is to say, I did not know that anyone else had recommended them; I merely described the operation as I performed it, but I quite admit that it would have been better if I had gone into the literature of the subject. I hope that Mr. Howell will accept this explanation.

March 10, 1916.

Yours truly,

J. S. FRASER.

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**THE OPERATION OF DACRYOCYSTORHINOSTOMY ; ITS
INDICATIONS AND AFTER-TREATMENT.**

BY JAMES B. HORGAN, M.B., CH.B.,

Laryngologist and Oculist to the North Infirmary, Cork.

A RETROSPECTION of the experience gained and the results obtained in twenty-eight cases upon which the operation of intra-nasal drainage of the lacrymal sac was performed has induced me to place on record some modifications of the technique as originally described by West and Polyák which have tended in my hands to simplify the operation, and to recall attention to the decided advantages which this operation possesses over any other for the relief of most forms of epiphora, dacryocystitis, ectasia of the sac, dacryocystoblenorrhœa, phlegmon and tear fistula, in fact for most anomalies of the tear-conducting mechanism. It must, however, be borne in mind that epiphora can occur as a result of congenital anomalies, inflammatory conditions of the lids, the conjunctiva or the eye-ball, or as a nervous manifestation in different conditions of nervous instability as well as in the early stages of paralysis of the sympathetic.

These advantages, as far as I am aware, have not been fully realised by rhinologists in this country, or, being realised, have not been given a sufficiently practical or prolonged test. This apparent lethargy may perhaps be due to a too hasty judgment of one or

two cases, or, as I am more inclined to think, to a conservatism on the part of our oculists who for one reason or another refuse to hand over their cases. As one who has had much practical experience of both ophthalmic and nasal surgery, and who regards a clean extirpation of the lacrymal sac as an operation demanding as much if not more skill than the performance of any other operation which the oculist in his special capacity may be called upon to perform, I have no hesitation in saying that, apart from its many other advantages, dacryocystorhinostomy is to the surgeon who is versed in the technique of intra-nasal surgery a considerably easier task than sac-extirpation is to the oculist. The mere fact that the tear-conducting apparatus lies in practically its entire extent contiguous to, if not actually surrounded by, structures which help to form the external nasal wall should in itself be sufficient to delegate the surgery of this region to the rhinologist. Further, all authorities are unanimous in their opinion that diseases and anomalies of the tear-conducting mechanism owe their incidence to some form of nasal disease, and that of eye diseases of nasal origin by far the larger proportion are secondary to disease of the lacrymal apparatus. From this it is evident that the surgeon who endeavours to treat lacrymal affections without first investigating and eliminating the causative nasal factor can entertain no real hope that his efforts will ultimately meet with success. Owing to the close association of their symptoms with ocular discomfort these patients almost without exception first consult the oculist, and I would here enter an earnest plea with the latter that if not himself conversant with the technique of intra-nasal examination and surgery he should, in the interest of everyone concerned, submit his patient to the care of a rhinologist.

I would like to point out here that these cases require to be kept under observation for from one to four months after operation if uniformly satisfactory results are to be obtained, and that because in the absence of suitable after-care and inspection it has failed to bring about an immediate cure of the lacrymal symptoms the operation has often been adversely criticised and rejected by those who have had the opportunity of performing it. I make a special point of seeing these cases at intervals of two weeks for a period of not less than two months subsequent to operation, even though no symptoms of lacrymal obstruction are complained of. Such symptoms are very apt to occur during the first six weeks, especially if the window of the sac is of small dimensions and the amount of bone which it was necessary to remove has been

comparatively extensive. A failure to appreciate and remove the cause of this obstruction has in the writer's opinion been responsible for the disheartening results obtained by some surgeons in their earlier cases despite an otherwise faultless technique. These obstructive symptoms are almost invariably due to the growth of granulation tissue from the cut surfaces of the surrounding bony margin, which, if not removed, will gradually tend to more or less obstruct the lacrymal window, especially in their final or cicatricial stages.

Toti ("Vorläufige Mitteilung über die Dakryozystorhinostomie," *La clinica moderna* Fir, Nr. 33, 1904) states that in his operation an extensive bone resection is of the utmost importance, otherwise a canal is formed instead of a flat depression, this canal subsequently closing up owing to the formation of granulation tissue. It is very important for the success of Toti's operation to make a complete removal of the medial and postero-superior wall of the sac, and I think from my experience the same holds good for the method advocated by West. I found in practice that this formation of granulation tissue was less prone to cause trouble in my later cases in which a more extensive removal of the sac wall and its surrounding bony framework had been undertaken. When these patients return to me at the appointed time I apply a pledget of cotton-wool soaked in cocain-adrenalin solution to the site of operation. I then pass a lacrymal sound for purposes of orientation, and carefully examine the area of recent operation. Under a good illumination any granulation tissue can be readily seen, and should be removed until the movements of the sound are free in all directions. If the patient had been complaining of a return of his obstructive symptoms these will be found to quickly disappear after this simple procedure, which it may be necessary to repeat as many as six, eight, or twelve times before the passage finally remains clear. At his last visit the patient is cautioned to return at once should his obstructive symptoms return.

Though the number of my cases has not been large it has embraced all those conditions for which this operation is performed, viz. acute and chronic dacrocystitis, the latter in two cases of over twenty-five years' duration; two cases in which a previous effort to extirpate the sac had proved ineffectual; simple epiphora that had failed to yield to other forms of treatment though the use of the syringe had failed to establish the presence of stenosis in any part of the duct; and cases complicated by the co-existence of tuberculosis and lupus in or about the tear-conducting apparatus.

I invariably start the operation by resecting the anterior portion of the quadrilateral septal cartilage; if it be deflected its resection is on all accounts desirable, if it be not so, its removal, which occupies but a few minutes, will still give an appreciable increase in the available field of vision. This can be considerably augmented by pressure with the speculum owing to the resultant resiliency of the columella and the remaining pillar of the quadrilateral cartilage. By this means an adequate view of the agger region and forus lacrymalis may be obtained even in the narrowest nose, and it is quite unnecessary to elevate and temporarily retropose a flap of mucons membrane antero-inferior to the site of operation as practised by West and others.

I never slit the canaliculus. Dilatation of the punctum permits the use of the lacrymal syringe for cleansing and anæsthetising purposes and afterwards for the introduction of the sound used for purposes of orientation.

Besides cocainising the site of operation in the nose, I now inject a few drops of a 3 per cent. cocain-adrenalin solution into the sac itself after it has been irrigated, and find that the anæsthesia is thereby considerably improved.

I use an ordinary septal elevator of the Freer type to first map out and then elevate the roughly circular muco-periosteal flap which is to be removed. I do not now retain any portion of this flap as suggested by Halle ("Modifikation der Westschen Operation," *Verh. d. laryng. Ges. zu Berlin* (Diskuss zu West), Jan. 26, 1912), and none of my patients have complained of the expression of air or mucus through the canaliculi whilst sneezing, though the lower canaliculus had, in five cases, been previously slit. I therefore cannot agree with Ritter ("Die Chirurg. d. Tränenwege," *Handb. des Spez. Chirurg. d. Ohres u. d. Ob. Luftwege*, Bd. iii, Lief. 6) that the operation should only be recommended with hesitation in those patients who have previously had the canaliculus slit up, even though the ultimate success might to some slight extent be mitigated by this procedure. West is of opinion that the formation of a flap from the inner wall of the duct is unnecessary as it very quickly atrophies and loses any useful effect. In a few cases in which I formed Halle's flap the results did not seem to justify the extra labour involved.

The amount of bone which it is necessary to remove to adequately expose the inner wall of the sac varies to an appreciable extent in individual cases. By this I do not mean to imply that the operation is more difficult in those cases in which the sac

occupies a more external position. Indeed, I have often remarked upon the relative ease with which the sac could be approached in cases in which it was necessary to traverse ethmoidal cells of the lacrymal or infundibular variety, especially if these latter were diseased, and that conversely in those cases in which the fronto-nasal process is, relatively speaking, more twisted in its long axis a comparatively greater and more difficult amount of chisel work was needed to penetrate this sclerotic bone and reach the lacrymal wall. According to Thorsch ("Beziehungen der Tränensackgrube zur Nase und ihren Nebenhölen," *Klin. Monatsbl. f. Augenh.*, 1909, Bd. xlvii, ii, S. 530), anterior ethmoidal cells, of one or other variety, intervene between the external nasal wall and the sac wall in 21 per cent. of cases; indeed, Salus ("Über die Dakryozystorhinostomie," *Klin. Monatsbl. f. Augenh.*, 1911, ii, S. 54) found this condition to exist in eighteen out of twenty-nine cases. It is even possible, according to Ritter ("Die Chirurg. d. Tränenwege," "Handb. d. Spez. Chirurgie des Ohres u. d. Ob. Luftwege," Bd. iii, Lief. 6), to find a deep nasal recess of the frontal sinus intervening between the inner sac wall and the nose. In this respect I might here draw attention to the close similarity that exists between the initial stages of this operation and that of the newer methods of intra-nasal drainage for chronic empyema of the frontal sinus. From my own experience of these cases I am unable to confirm Ritter's statement that the lacrymal bone to some small extent in its superficies ethmoidalis behind the posterior edge of the fronto-nasal process takes part in the formation of the lateral nasal wall (*Verhand. d. laryng. Ges. zu Berlin*, 1910, S. 66). The percentage of such cases, if they occur, must be very small.

I always remove enough bone to thoroughly expose the inner aspect of the sac and upper part of the duct, in which endeavour I am directed by continual orientation with the sound passed from the outside. In so using the sound it is advisable if possible to avoid perforating the inner wall of the sac as the resulting laceration usually renders it harder to make a clean excision.

I have often experienced considerable difficulty in excising a suitable portion of the sac wall. It is advisable to remove a relatively-speaking large portion, if possible oval in shape and with its long axis vertical. I have ceased to employ West's forceps for grasping the wall preparatory to excision, as I found them to be clumsy in use and liable to tear out after they had obtained a hold. I now bulge the wall of the sac inwards tent-wise with the sound, and, having incised the wall anteriorly in a vertical direction

with a sharp scalpel, complete its removal with a fine curved scissors or with the scalpel. I should think that if such were devised, a fine angular forceps of the Hartmann variety that would bite out a clean portion of the sac wall after the same had been presented to it by the sound would considerably facilitate this part of the operation. I found it necessary to remove the anterior end of the middle turbinal in three of my cases at the time of operation, and in one case owing to its adhesive tendency on a subsequent occasion. If there is any doubt about its liability to favour obstruction, I think it would be wiser to resect a small portion at the time of operation. Thorsch ("Beziehungen der Tränensackgrube zur Nase und ihren Nebenhölen," *Klin. Monatsbl.f. Augenh.*, 1909, Bd. xlvii, ii, S. 530) is of opinion that this structure is so markedly developed as to require partial resection in 35 per cent. of cases.

In two of my cases the lacrymal trouble was found to be complicated by, if not caused by, lupus of the ipso-lateral nasal cavity, the disease involving the septal mucous membrane and extending on to the floor and lateral wall of the nose in the neighbourhood of the duct opening. Caboche ("Tuberculose de la pituitaire," *Ann. des mal d'oreille*, October, 1907) states that in 50 per cent. of cases of nasal lupus the lacrymal mucous membrane is affected. In both of my cases the affected septal mucous membrane was removed *en masse* and that on the floor and wall curetted and then cauterised with trichloroacetic acid. The results have been excellent; not only have these patients remained free from lacrymal symptoms, but the infective process in the first case, which is now more than twelve months after operation, appears to be quite arrested. I do not therefore agree with Ritter when he states that the presence of any infective intra-nasal process should be looked upon as a contra-indication to the performance of a dacryocystorhinostomy.

One of my cases, a lad aged sixteen, was suffering from tubercular disease of his ocular and palpebral conjunctiva and a chronic pneumococcal infection of the sac causing muco-purulent discharge and obstruction. Though the latter affection was cured by intra-nasal drainage of the sac more than three years ago, and preparatory to making any attempt to cure the conjunctival disease I did not observe any tendency for the conjunctival infection to spread to the nasal mucosa and have had no cause to regret any line of action. The conjunctival disease has since been arrested.

In three of my cases, two of which were complicated by

external fistula, a previous effort to extirpate the sac had failed. Of these cases two were immediately successful, the fistula in one case closing in a few days without any external treatment though it had existed for more than ten years. In the other fistula case the canaliculus and outer wall of the sac had apparently been injured at the primary operation, and a periodical passage of the sound is necessary to prevent cicatricial stenosis. I am hopeful about the ultimate complete cure of this case.

I think, therefore, I am justified in concluding that no matter what form of external operation has been previously though unsuccessfully employed in cases of chronic dacryocystoblenorrhæa, these patients should not be regarded as hopeless until an effort has been made to rid them of their very distressing and disfiguring disease by establishing intra-nasal drainage.

I performed the operation in a child aged six who had suffered since infancy from a chronic muco-purulent dacryocystitis, which had resisted prolonged treatment with the syringe and sound. This child was anæsthetised in the sitting position with C.E. mixture, cocain-adrenalin solution being used locally. Owing to the diminutive size of the nasal cavity and the relatively large size of the instruments—the ordinary instruments of West were used—the field of vision was very restricted. My difficulties were further increased by a septal deflection which I did not deem it safe to resect in so young a patient, and to the scrofulous condition of the child, which did not permit of a prolonged or deep anæsthesia. I was, however, able to expose and resect a portion of the inner sac wall entirely to my satisfaction, and the immediate result of the operation was all that could be desired. The subsequent course of this case has not been so gratifying. Owing to her intolerance of nasal examination and treatment I have been unable to control the site of the naso-lacrymal window. This I have little doubt has become partially occluded by the growth of granulations which I am unable either to see or to remove. The sac has, however, remained free from purulent secretion or retention, and epiphora is rarely noticed except when for any reason the lacrymal secretion is excessive. This symptom it is possible to control, by the periodic passage of the sound per canaliculus, and as the intervals at which this is necessary are becoming greater, I am optimistic as to the ultimate success of my efforts. I am unable in the literature at my disposal to find any record of this operation having been attempted in so young a patient.

I will conclude these remarks by stating with Ritter that at

least from the rhinologist's point of view one can but wish that this "physiological operation" of West's may gradually—indeed I would rather say quickly—become the normal method of operation in these cases, as its results in all respects surpass those obtained by any other method. It is, however, as the same authority remarks, not to be forgotten that this method of operation makes big demands on the experience and technical ability of the operator, and will therefore in all probability fail to give equally good results in the hands of all. In this respect I would again lay stress on the need for the methodical supervision and after-treatment of these patients.

ATROPHIC RHINITIS (OZÆNA) AND TUBERCULOSIS.

II. TUBERCULIN IN ATROPHIC RHINITIS.

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DURING the past three years I have had under my care at the Central London Throat and Ear Hospital a number of patients—seventeen—all of whom were suffering from atrophic rhinitis. All the patients were subjected to the tuberculin test.

Tuberculin Test: Method.—The method followed was that of Camac Wilkinson; and, although it may be already widely known, I shall here restate it, so that other workers who may wish to repeat the test may do so with precision.

The patient is given a clinical thermometer, and is instructed in the taking and recording of his own temperature, which he does four times daily at intervals of four hours. For the first week nothing else is done, in order that he may become accustomed to the task, and that the physician may be sure that the temperature is accurately recorded. When the records show the temperature to be continuously and uniformly normal—that is to say not above 99° F.—standard test doses in the following rotation, .001 c.c., .005 c.c., .01 c.c., and again .01 c.c. old tuberculin (Koch's original tuberculin) are given at intervals of three days.

Caution.—It must not be understood that these standard doses are to be given exactly as stated in every case, as a mild reaction

may occur after any one dose, and it may only be necessary either to slightly increase the test dose on the subsequent occasion, or even only to repeat the previous dose. It must also be remembered, in this connection, that the dose necessarily varies with the age and general condition of the patient. Thus, in a child of twelve years of age only half the adult dose would be given at the start, and so on in regard to the patient's age.

The dose is given hypodermically in the outer aspect of the upper arm, under strictly aseptic conditions, the part being thoroughly cleansed with alcohol. Each arm is used alternately both for further test doses and also for therapeutic doses.

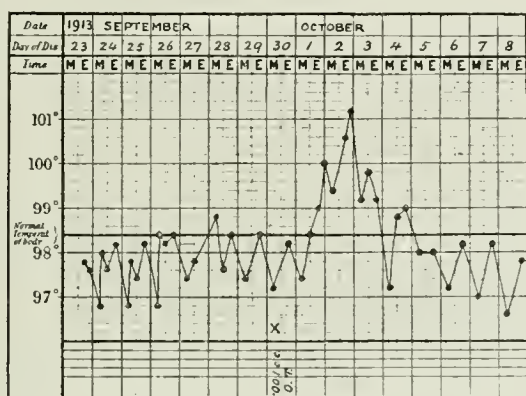


FIG. 1.—O.T. test dose reaction in A.R. (Case 3).

Reaction may be general, local, and focal, and it usually occurs in from twenty-four to forty-eight hours after the test dose is given.

General reaction consists in the usual malaise, headache, and rise of temperature to 100° F. or more. The *local reaction* consists in redness and swelling round about the site of the injection ; sometimes it is very violent both in degree and extent. A *focal reaction* will be denoted by an increased discharge from the nose of a more watery character, any crusts coming away with much greater ease, and may occur within an hour or two after the dose. The general reaction lasts only a short time, the temperature and symptoms of general disturbance disappearing in a few hours. The local reaction may last from two or three days to a week. The focal reaction, when it occurs, lasts generally from a few hours to a few days.

If there is no response to the first test dose, a second, increased

dermic test was not used as the von Pirquet test was followed both by a local reaction and by rise of temperature, and the reaction was considered equivalent to a positive with the hypodermic test.

The following is a list of the cases tested by me:

- (1) F. K——, aged twenty-one, female, A.R. 10 years. Reaction + Treated with tuberculin.
- (2) M. C——, aged twenty-three, male, A.R., phthisis. Reaction + Treated with tuberculin.
- (3) E. S——, aged thirty-nine, female, A.R., phthisis. Reaction + Treated with tuberculin.
- (4) K. A——, aged sixteen, female, A.R. Reaction + Treated with tuberculin.
- (5) M. W——, aged eighteen, female, A.R. Reaction + Treated with tuberculin.
- (6) W. A. W——, aged thirty-two, male, A.R., phthisis. Reaction + Treated with tuberculin.
- (7) E. I——, aged sixteen, female, A.R. Reaction + Treated with tuberculin.
- (8) M. S——, aged twenty, female, A.R., phthisis. Reaction + Treated with tuberculin.
- (9) A. P——, aged eighteen, female, A.R. Reaction + Treated with tuberculin.
- (10) C. H——, aged twelve, female, A.R. Reaction + Treated with tuberculin.
- (11) A. A——, aged thirteen, male, A.R. Reaction + Treated with tuberculin.
- (12) A. M——, aged seventeen, female, A.R., cough, no B.T. Reaction + Treated with tuberculin.
- (13) M. B——, aged sixteen, female, A.R. Reaction + Treated with tuberculin.
- (14) R. C——, aged seventeen, male, A.R. Reaction + Treated with tuberculin.
- (15) A. B——, female, A.R. Reaction + Treated with tuberculin.
- (16) L. M——, aged fourteen, female, A.R. Reaction + Treated with tuberculin.
- (17) L. D——, aged fourteen, female, A.R. Reaction negative.

In several of the cases evidence of a focal (nasal) reaction was forthcoming in an increase in the nasal discharge.

In the last case, the only one which gave a negative response, the Wassermann reaction by Dr. Wingrave turned out to be

partially positive, so that it probably was a case of syphilitic ozæna, of which we have had several, closely simulating the typical ozæna, but differing from it in the fœtor and in a tendency to ulceration.

In my opinion the tuberculin tests upon these cases indicate the presence of a tuberculous focus of disease. The percentage (94 per cent.) is very much higher than the percentage of positives among the general community. If we exclude the syphilitic case, then, of course, the reaction was positive in 100 per cent.

Tuberculin Treatment.

Method.—After the positive reaction has been obtained, as described above, and all the signs and symptoms resulting from the reaction of the test dose have subsided, the first therapeutic dose is given. This consists of a quantity of Perlsucht (bovine) tuberculin much inferior in strength to the dose of O.T. used in the test doses. As a rule, P.T.O. of strength 1 in 25 is employed at the start, the injections being given twice a week, on every third or fourth day, in gradually increasing doses, beginning usually, in an adult, with about .01 c.c. The guide to the rate of increase of the dosage is the temperature, weight, and general condition of the patient. The temperature is regularly taken by the patient every four hours on at least four occasions during the day—8 a.m., 12 noon, 4 p.m., 8 p.m.—during the whole course of treatment. In this way the dose is gradually increased until 1 c.c. of pure undiluted P.T.O. is reached. Then the second phase of the treatment is entered upon, beginning, as a rule, with .02 c.c. of P.T., which, being clinically fifty times as strong as P.T.O., is equivalent in strength to the last dose of P.T.O. P.T. is given by ever-increasing bi-weekly doses until 1 c.c. P.T. is reached. The third phase now follows, and consists in the use of O.T. (Koch's original tuberculin—the tuberculin of the test dose), beginning with .25 c.c., which is practically equivalent clinically to the last dose of P.T., and rapidly increasing until the large dose of 1 c.c. O.T. is reached in the course of four or five doses. This, in the majority of the cases, completed the first course of treatment, but in two of the cases I followed on with a short administration of B.E. (bacillary emulsion). The complete first course usually occupies about six to nine months, and is interrupted, restrained, or pushed, according to the temperature, weight, the general condition of the patient, and the effect produced by each dose.

Dosage.—It must be remembered that no hard and fast rule can be followed in regard to the ratio of increase of therapeutic doses any more than in regard to test doses. For instance, for some patients the rate of increase may be $\frac{1}{4}$, $\frac{1}{3}$, or even $\frac{1}{2}$. Much smaller increases, however, may be indicated in some cases. Experience will have to be the guide, as it is not possible to give an unvarying ratio of doses suitable for every individual alike. The great point to aim at is to produce, if possible, a mild local, general, and focal reaction after each dose. If a general reaction,

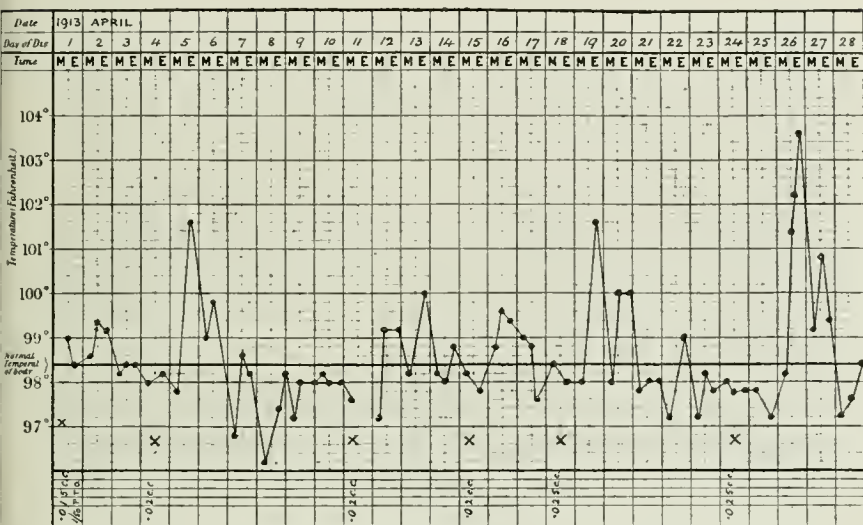


FIG. 3.—Therapeutic course. Patient sensitive. See Notes (Case 1).

indicated by a rise in temperature to 99.4° or 99.6° F., is obtained the dose given on the previous occasion is usually repeated, but should the temperature rise to 100° F. or above no dose is given for a week. Another point which it is important to recognise is when the ratio of dosage may with safety be increased.

It sometimes happens in hospital practice that a patient may absent himself for a week or more, and in that case one cannot go on without interruption of ratio of increase. After a week's absence the last dose given is repeated, at the end, say, of a month, give from $\frac{1}{10}$ to $\frac{1}{3}$ of the last dose given.

NOTE.—Old tuberculin (tuberculinum Kochi) is approximately five times as strong as Perlsucht tuberculin (P.T.), and P.T. is fifty times as strong as Perlsucht-tuberculin-original (P.T.O.).

About three months after the first course of treatment is finished the patient is re-tested with tuberculin, and if a positive reaction ensues a second course of treatment is recommended. If the re-test is negative no further treatment is recommended, unless there is evidence by subsequent re-testing doses of an active state or focus of disease.

The standard re-testing doses are, .005 c.c., .01 c.c., .05 c.c., .1 c.c. old tuberculin, given in same way as the original testing dose.

The following are the notes and case-histories of the ozænatous patients treated in this manner. Fig. 3 illustrates Case 1, in which the patient was very sensitive to the tuberculin, reacting severely at the outset and necessitating some caution, but who soon settled down and became thereafter easy to treat.

CASE 1.—B. P——, male, aged ten.

1913. March 18.—v.P. reaction = + excessive.

March 25.—First therapeutic dose (.02 of 1 in 50 P.T.O.; dose small because of susceptibility as evidenced in v.P. test), followed by temperature 100.8° F. This boy reacted violently for a month, temperature rising on one occasion to 103.8° F. There were five reactions to over 101° F. But later, under treatment, the reactions moderated, although they continued to the end.

Result: April 9, 1915.—No tuberculin treatment for a year. The mother says: "Is very much better. Has considerable discharge from the nose now, but very much less than when he came first. The headaches—a special feature in the case—are much less now. His colour is better. Fœtor very great when he first came, is only occasional now.

CASE 2.—F. K——, female, aged twenty-one. A.R. of ten years' duration.

1914. October 20.—First test dose of tuberculin. Reaction negative.

Second test dose. Reaction negative.

Third test dose. Reaction positive, local and general (temperature 101.8° F.).

November 6.—First therapeutic dose. Treated in the usual way with graded doses of the tuberculins.

1915. May 7.—1 c.c. O.T. Then on to B.E.

June 25.—Final dose, 0.6 c.c. B.E.

September 21, 1915.—Seen by D. M——. "Is very much better in every way, Has much more colour. People remark how well she looks. No longer uses a nasal lotion. There is very little discharge, and fœtor is hardly ever noticed."

Nose: Quite clean and free from crusts. Atrophy, I.S.Q.

Lungs: Normal.

Family History: Mother died of phthisis when patient was two years of age.

CASE 3.—M. C——, male, aged twenty-three. A.R. mild.

Phthisis pulmonalis. Numerous B.T. in sputum.

1913. September 30.—Test dose: Positive reaction. Temperature 101.2° F.

October 10.—Treatment with P.T.O. begun. Began with .005 c.c. P.T.O. $\frac{1}{10}$ strength. Then .01 c.c. P.T.O. $\frac{1}{5}$, which was followed by reaction, temperature rising to 103.6° F. The rest of the course showed practically no reaction.

1915. March 19.—Sputum: No B.T.

Nose: Great improvement. No crusts and no fœtor now. Nose looks very healthy, though atrophy is still present.

Lungs: No evidence now of active pulmonary disease. Patient has been accepted for the Italian Army.

CASE 4.—E. S —, female, aged thirty-nine. A.R. Phthisis pulmonalis.

1912. October 8.—Test dose. Positive reaction. Temperature, 101.8° F. *Sputum*: No B.T. Very sensitive to tuberculin.

November 15.—Discharge from nose much less. Recovering smell.

December 3.—Subjective and objective fœtor no longer present.

December 23.—*Sputum*: B.T. present.

1913. January 31.—Influenza. Temperature about 101° F. for seven or eight days.

April 14.—*Sputum*: No B.T. Still occasional rises of temperature to 99° F.

July.—After completing the course of treatment temperature now regularly normal and subnormal.

Lungs improved.

November, 1913.—Nose very much better. Sense of smell good. On examination only slight crust formation observed.

December 17.—*Sputum*: No B.T.

1914. March 10.—*Sputum*: No B.T. Re-tested up to .1 c.c. O.T. No reaction.

1915. February.—Bronchitis. *Sputum*: No B.T.

May 14.—*Sputum*: No B.T.

April 9.—*Examination of Nose*: Both nares very capacious. Nose very much better than it used to be. No fœtor. No crusts. Only slight dryness of the mucous membrane. Inferior turbinals shrunken. Middle turbinals enlarged, especially on left.

CASE 5.—K. A —, female, aged sixteen. A.R.

November 11.—Test dose. Reaction positive. Temperature, 100° F.

November 28.—Ther. dose.

1914. October 13.—Course of tuberculin completed. Very evidently better during treatment. On the whole improved to some extent, but not decidedly.

CASE 6.—M. W —, female, aged eighteen. A.R.

1912. December 10.—Test dose (.001 c.c. O.T.). Slight reaction.

December 13.—Test dose (.003 c.c. O.T.). Reaction positive. Temperature, 100° F.

December 23.—Therapeutic course begun. Temperature was very unstable during the course. *Sputum* repeatedly examined. No B.T.

1913. February 14.—Some fœtor still from nose.

July 11.—Nose not so well.

July 22.—Therapeutic course finished.

August 12.—Crusts in naso-pharynx.

August 22.—Crusts less. Nose improved up to the end of the course; after that it relapsed. Second course declined.

1914. January 20.—Reports herself better, but I cannot confirm her statement altogether. The objective fœtor, however, is less.

CASE 7.—W. A. W —, male, aged thirty-two. A.R.

1913. August 12.—Cough. *Sputum*: No B.T.

August 26.—Test dose (.001 c.c. O.T.). Reaction positive. Phthisis pulmonalis.

September 5.—Therapeutic course begun.

1914. February 10.—Nose greatly improved. Temperature running between 97° and 99° F.

May 5.—*Sputum*: T.B. present. In bed with pleurisy.

July 17.—Treatment interrupted by feverish attacks. Only got as far as 0.2 c.c. O.T.

Note.—The first sign of tuberculosis in this case was atrophic rhinitis.

CASE 8.—E. I——, female, aged sixteen. A.R.

1913. August 26.—Typical reaction with second test dose of .005 c.c. O.T.

September 5.—Therapeutic course begun. Irregular temperature.

1914. March 24.—Glycerin plugs used for the nose. Had to leave off treatment after reaching .875 c.c. P.T.

Result: Nose improved.

1915. September 24.—Some crusting. A good deal of discharge. Uses glycerin tampon.

CASE 9.—M. S——, female, aged twenty. A.R. Atrophic laryngitis. Cough.

1913. April 26.—*Sputum:* No B.T.

May 16.—Test dose. Reaction positive. Temperature, 99.8° F. *Sputum:* B.T.

May 27.—Therapeutic course begun. Temperature regular.

September 16.—Nose reported improved; less fœtor; less discharge.

November 14.—Nose better. Cough gone.

1914. January 16. Finished course. General condition much improved. Used to lose voice in winter. Voice normal. No cough or expectoration.

April 7.—*Sputum:* No B.T.

1915. February 16.—“Getting on very well, and is very well.” No cough or expectoration. Has occasional crusts from nose. None visible to-day.

CASE 10.—M. T——, female, aged eight. A.R.

1912. July 9.—Von Pirquet test followed by local and constitutional reaction, temperature rising to 101.8° F.

July 19.—First therapeutic dose. Child very sensitive. Temperature irregular.

September 10.—“Much better.” Temperature now becomes more regular.

November.—Temperature again irregular.

1913. January 14.—General health improved, but fœtor from nose very marked.

January 24.—Ozæna still very objectionable—“Cannot sit with the child.”

February 18.—Fœtor much less than it used to be. General health much better. “A different child.”

June 13.—A new therapeutic course advised, the old one having been completed, as the A.R. is still marked. Started with O.T. right away.

August 5.—1.25 c.c. O.T. Nose much better. Rest from treatment for a month, during which the nose relapsed.

October 21.—A third course of O.T. begun.

November 11.—Nose certainly better during the treatment, but it relapses when the treatment is stopped.

December 30.—Third course completed with 1.5 c.c. O.T.

1914. January 2.—Nose very much better. Some muco-pus. No crusts. The discharge comes away very much easier while under treatment, as do the crusts when they are present; that is, the discharge is liquefied by the tuberculin, equivalent to a focal reaction.

January 13.—Crusts considerable to-day.

March 13.—“Is very much better; only occasionally crusts and no smell” (fœtor). On examination still some crusts in both nares.

March 17.—A fourth course begun.

May 15.—1.3 c.c. O.T. “Smell gone” (i. e. fœtor gone).

May 19.—.015 c.c. B.E. (bacillary emulsion which contains the entire bacillary substance).

June 12.—“Nose smelling again”—“always worse in summer.”

September 4.—Away on holiday; nose very well; “nothing the matter with it.”

1915. February 16.—Has been ever so much better. Quite a different child as regards her nose. On examination the nose is found to be much better; only some slight dry mucus now. Little or no fœtor.

September 24.—“Still crusts and sometimes fœtor, but less than formerly. Has relapsed a little.”—D. M.

CASE 11.—A. P —, female, aged eighteen. A.R.

1913. After two negatives, marked positive reaction on January 21.

January 28.—First therapeutic dose, .01 c.c. P.T.O. $\frac{1}{25}$.

Patient ran a very regular subnormal temperature.

June 20.—Condition of nose very much improved. Still under treatment. Urticaria followed several doses recently.

August 8.—Nose very much better.

September 12.—1 c.c. O.T. Course finished.

September 16.—Nose examined; very much better. Crusts very few and interior of nose moist.

November 18.—Improvement maintained. No crusts for the last month and very little discharge. Nose shows slight dryness and a few “cobwebs” on examination. Had been previously under ordinary treatment for three and a half years. Seen by D. M., who thought the condition almost cured.

CASE 12.—C. H —, female, aged twelve. A.R.

1913. September 12.—Seven test doses before reaction positive.

October 10.—*Sputum*: No B.T.

October 14.—.01 c.c. P.T.O. $\frac{1}{25}$. Occasional rises of temperature for a time.

1914. August 4.—0.75 cc. P.T. Then a rest until September 11. .08 cc. P.T.

December 1.—1 c.c. O.T. Course completed. Nose “about the same.” Smell and crusts continue.

CASE 13.—A. A —, male, aged thirteen. A.R. Chronic suppuration of the middle ear.

1913. October 7.—Temperature ranging between 97° and 99.4° F. After three test doses (October 14) violent reaction. Temperature, 103.8° F.

October 25.—Therapeutic course begun.

November 28.—“Nose a little better.” Temperature very irregular.

1914. May 13. Discharge from nose much less. Fœtor has gone.

May 29.—1 c.c. O.T. Course completed. “Nose much better.”

1915. May 23.—No fœtor now. Is very well. Slight crusts in left naris.

Summary of Cases.

Total = 13, of which 4 suffered from phthisis pulmonalis.

Results:

Great improvement	.	.	.	.	.	7
Improvement	.	.	.	.	.	3
Improved, but relapsed	.	.	.	.	.	2
Uninfluenced by treatment	.	.	.	.	.	1

A focal (nasal) reaction was observed in several cases during the treatment.

In three of the phthical cases (Cases 4, 5, and 9) it is worthy

of note that both the lungs and the nose improved together, and that arrest of the pulmonary disease took place. Case 7 (phthisis) was interrupted and did not do so well as the others.

The completion of the experimental treatment of atrophic rhinitis with tuberculin confirms me in the opinion I expressed at the annual meeting of the British Medical Association at Brighton in 1913, that atrophic rhinitis is a tuberculous affection.¹

REPORTS FOR THE YEAR 1915 FROM THE EAR AND THROAT DEPARTMENT OF THE ROYAL INFIRMARY, EDINBURGH.

Under the care of A. LOGAN TURNER, M.D., F.R.C.S.E., F.R.S.E.

PART II.

STATISTICAL TABLES.

By HAROLD CHAFFER, M.B., F.R.C.S.E.,

Senior Clinical Assistant.

AFFECTIONS OF THE NOSE.

(1224)

I. *The External Nose.*

Dermatitis of vestibule	29
Fracture of nasal bones	5
Lupus	4
Tubercular bone disease	1
Saddle-back deformity	2
Papilloma	1
Fibroma	1
Cyst	1
Sclaceous adenoma	1
Abscess	1
Collapse of alæ nasi	2

48

II. *The Nasal Cavities.*

Deflection of septum to right	150
Deflection of septum to left	143
Irregular deflections	30
Perforation of septum	5
Hæmatoma and abscess of septum	2
Simple ulcer	1
Acute, subacute, and chronic rhinitis	194
Inferior turbinal enlargement	290
Polypoid middle turbinals and nasal polypi	130
Purulent rhinitis	12
Fibrinous rhinitis	2
Rhinitis caseosa	1
Atrophic rhinitis (non-fetid)	26
Atrophic rhinitis (fetid)	26

¹ *Brit. Med. Journ.*, August 23, 1913, p. 444.

Epistaxis	36
Rhinitis sicca	15
Lupus of nasal mucous membrane	10
Congenital syphilitic disease of nasal cavities	2
Acquired syphilitic disease (tertiary) of nasal cavities	8
Rhinolith	1
Foreign bodies in nose	10
Nasal neuroses (including asthma)	77
Simple tumours	3
Malignant tumours	2
Congenital deficiency of vomer	1
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	1176

NASAL ACCESSORY SINUSES. (91)

Catarrhal inflammation of antrum	7
Acute suppuration of antrum	3
Chronic suppuration of antrum	40
(Right side, 11; left side, 17; bilateral, 12.)	
Acute frontal sinus catarrh	4
Acute frontal sinus suppuration	3
(One with orbital abscess.)	
Acute ethmoidal and antral suppuration (with orbital abscess)	1
Chronic ethmoidal and antral suppuration	2
Chronic ethmoidal suppuration	2
Chronic ethmoidal and sphenoidal suppuration	2
(One with fatal basal meningitis.)	
Chronic frontal and ethmoidal suppuration (bilateral)	1
Chronic frontal, ethmoidal, and antral suppuration	5
(One with orbital abscess.)	
Pansinusitis	4
Naso-antral polypi	3
Dental cysts invading antrum	7
Mucocele of left frontal sinus	1
Malignant disease involving antrum	4
Malignant disease involving sphenoidal sinus	1
Osteomyelitis of right superior maxilla	1
	<hr/>
	91

DISEASES OF NASO-PHARYNX, PHARYNX, FAUCES, AND MOUTH. (1473)

Adenoids and enlarged tonsils	1160
Acute tonsillitis	54
Peritonsillar abscess	16
Vincent's angina	1
Diphtheria	3
Acute retro-pharyngeal abscess	3
Acute catarrhal pharyngitis	14
Pneumococcal naso-pharyngitis	1
Chronic catarrhal and granular pharyngitis	75
Pharyngitis sicca	22
Keratosis pharyngis	2
Retention cyst of tonsil	3
Elongated uvula	1
Varicose veins at base of tongue	2
Hypertrophy of lingual tonsil	3
Lupus of soft palate and pharynx	3
Tubercular retro-pharyngeal gland	2
Tubercular ulcer of tongue	1
Congenital syphilis of pharynx	1
Secondary syphilis of fauces and pharynx	7
Tertiary syphilis of pharynx	13
Simple tumours of pharynx	3
Malignant tumours of fauces and pharynx	17

Malignant tumours of naso-pharynx	2
Foreign bodies in fauces and pharynx	13
Sensory neuroses	23
Post-diphtheritic paralysis	1
Insufficiency of palate (congenital)	1
Cleft palate	3
Prominent cervical vertebra	1
Angioma of tongue	1
Nævus of mucous membrane of cheek	1
Hæmorrhage from gums	1
Pemphigus of tongue	2
Neurosis of tongue	3
Thyro-glossal cyst	1
Ranula	2
Submaxillary calculus	1
Alveolar fibroma	1
Ulcerative stomatitis	2
Alveolar abscess	1
Lupus of gums	1
Oral sepsis	5
	<hr/>
	1473

AFFECTIONS OF THE LARYNX AND TRACHEA. (166)

I. *Acute.*

Acute catarrhal laryngitis	18
--------------------------------------	----

II. *Chronic.*

Chronic catarrhal laryngitis	35
Laryngitis sicca	8
Vocal nodules	2
Pachydermia of larynx	2
Lupus of larynx	2
Tubercular disease of larynx	23
Syphilitic disease of larynx (acquired)	7
Congenital syphilitic disease of larynx	1
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	80

III. *Tumours.*

Simple:	
Papilloma of larynx	1
Malignant:	
Intrinsic carcinoma	2
Extrinsic carcinoma	8
	<hr/>
	11

IV. *Affections of Laryngeal Nerves.*

Functional aphonia	19
Recurrent paralysis of left vocal cord	6
Recurrent paralysis of right vocal cord	2
Bilateral abductor paralysis	1
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	28

V. *Miscellaneous.*

Laryngeal spasm due to adenoids	1
Foreign bodies in larynx	2
Foreign body in bronchus	1
Stenosis of larynx	1
Post-diphtheritic stenosis of larynx	2
Cut-throat: Removal of larynx	1
Perichondritis of left arytaenoid	1
Goitre	20
	<hr/>
	29

AFFECTIONS OF THE ŒSOPHAGUS.

(33)

Stricture :	
(a) Simple	2
(b) Malignant (including post-cricoid carcinoma)	8
Foreign bodies in œsophagus	16
Neurosis of hypo-pharynx and œsophagus?	7
	<hr/>
	33

AFFECTIONS OF THE EAR.

(1834)

I. *The External Ear.*

Congenital malformation	2
Injury to ear	5
Hæmatoma	1
Cyst of auricle	2
Erysipelas of auricle	1
Angio-neurotic œdema of auricle	1
Cerumen	133
Furunculosis	45
Exostosis	2
Foreign bodies in ear	3
Traumatic perforation of membrani tympani	7
Glandular abscess over mastoid	3
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	205

II. *The Middle-ear Cleft.*

Eustachian obstruction	221
Otosclerosis	49
Mixed middle- and inner-ear deafness (non-suppurative)	34
Hysterical mastoiditis	1
Acute non-suppurative otitis media	111
Chronic non-suppurative otitis media	100
Acute suppurative otitis media :	
Right	67
Left	62
Bilateral	15
Chronic suppurative otitis media :	
Right	167
Left	151
Bilateral	78
Sequelæ of chronic suppurative otitis media :	
Right	66
Left	63
Bilateral	67
Acute suppurative otitis media with mastoid complication :	
Right	18
Left	22
Chronic suppurative otitis media with mastoid operation :	
Right	58
Left	62
Tubercular otitis media :	
Right	4
Left	5
Bilateral	5

1426

III. *Intra-cranial Complications of Suppurative Otitis Media* (19 cases).

Six complicating acute otitis media.

Thirteen complicating chronic otitis media.

Extra-dural abscess	6
Middle fossa, 2.	
Peri-sinus, 4.	

Temporo-sphenoidal abscess	2
Cerebellar abscess (one bilateral case)	4
Sigmoid sinus thrombosis	7
Primary jugular bulb with inferior petrosal and cavernous sinus thrombosis	1
Serous meningitis	1
Acute purulent lepto-meningitis	9
General septicæmia	1
Pyæmic abscesses of lung	1
(Tuberculous meningitis)	1
	<hr/>
	33

Sixteen cases were operated upon (remaining three being moribund on admission), with 10 recoveries, 6 deaths.

The following cases recovered after operation :

- Extra-dural abscess in middle fossa with serous meningitis.
- Extra-dural abscess with temporo-sphenoidal abscess.
- Temporo-sphenoidal abscess.
- Peri-sinus abscess (2 cases).
- Peri-sinus abscess with sigmoid sinus thrombosis.
- Sigmoid sinus thrombosis (2 cases).
- Sigmoid sinus thrombosis with diffuse purulent labyrinthitis and septicæmia.
- Perisinus abscess, sigmoid sinus thrombosis, purulent lepto-meningitis and cerebellar abscess.

The following Cases died after operation :

- Acute purulent lepto-meningitis.
- Sinus thrombosis and acute purulent lepto-meningitis (2 cases).
- Cerebellar abscess (bilateral) and purulent meningitis.
- Cerebellar abscess and purulent basal meningitis.
- Thrombosis of jugular bulb, inferior petrosal, and cavernous sinuses with abscesses in lung.

The cases dying without operation :

- Acute purulent lepto-meningitis (3 cases).

IV. Internal Ear Affections.

Congenital (including deaf-mutism)	14
Traumatic (following shell explosion)	16
„ (following injury other than shell explosion)	6
Occupational	12
Functional	3
Senile changes	7
Serous labyrinthitis	15
Suppurative labyrinthitis	4
Toxic	1
Congenital syphilis	11
Acquired syphilis	5
Malignant disease of base of skull involving inner ear	1
Suspected cerebellar lesion	1
Unknown causes	67
Aural neurosis and neuralgia	7
	<hr/>
	170

MISCELLANEOUS CASES.

These include cases sent from other wards in the hospital with negative findings, enlarged cervical glands, skin diseases, obscure headache, mental defects, eye cases, carious teeth, aneurism, hæmoptysis, dacryocystitis, parotitis, epilepsy, leontiasis ossium, bad enunciation, epiphora, sycosis, malignant disease, neck, etc., etc.

These cases numbered 152

TABLE OF OPERATIONS.

The Nose.

Fracture of nasal bone (rectified)	1
Fracture of nasal septum (rectified)	1
Abscess of nasal septum	1
Nasal spur removed	1
Submucous resection of septum	184
Turbinectomy	76
Nasal polypi	145
Curetting (for lupus)	6
Ionisation (for lupus)	22
Foreign bodies removed	6
Injection of paraffin	1
Operation on tear sac	1
	<hr/> 445

The Accessory Nasal Sinuses.

Proof puncture of antrum	103
Intra-nasal operation on antrum	4
Radical operation on antrum	33
Removal of malignant tumour of antrum	1
Radium applied for malignant disease of antrum	1
Radical operation on frontal and ethmoid sinuses	5
Operation on ethmoid cells (intra-nasal)	3
Naso-antral polypi (opening of antrum)	4
Dental cyst	4
	<hr/> 158

The Pharynx.

Tonsils and adenoids removed (guillotine and curette)	1030
Tonsils dissected out (scissors and snare)	36
Peritonsillar abscess	11
Retro-pharyngeal abscess	1
	<hr/> 1078

The Larynx, Trachea, and Esophagus.

Suspension laryngoscopy (examinations)	10
Suspension laryngoscopy (with operation)	3
Bronchoscopy (removal of pin)	1
Tracheoscopy (examination)	1
Esophagoscopy (examinations)	24
Esophagoscopy (removal of foreign bodies)	11
Tracheotomy	8
	<hr/> 58

The Ear.

Schwartz operation on mastoid	43
Radical mastoid operation	126
Operations on labyrinth	6
Mastoid explored for shrapnel	1
Extra-dural abscess	6
Cerebellar abscess	3
Temporo-sphenoidal abscess	2
Operation upon lateral sinus	8
Ligature internal jugular vein	6
Papilloma of ear	2
Paracentesis	31
Ear granulation curetted	3
Furunculosis	3

Glandular abscess behind ear	6
Plastic operation	7
Eustachian tube curetted	1
Aural polypi	21
Foreign bodies removed from ear	3
	<hr/>
	278
Injection of galyol	2
Injection of salvarsan	2
	<hr/>
	4
<i>Anæsthetics administered.</i>	
Chloroform followed by ether	273
Ethyl chloride	1041
Local anæsthesia	650
	<hr/>
	1964
Number of new patients attending the Department during 1915 = 3233.	

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE—OTOLOGICAL SECTION.

February 18, 1916.

President: DR. ALBERT A. GRAY.

Tumour on Concha after Radical Mastoid Operation (shown at the last Meeting).¹—W. M. Mollison.—The tumour on the concha proved to be skin, with some fibrous tissue underneath; there was no cartilage in it.

The PRESIDENT: Is it keloid? It does not yet present that appearance. One views these growths which appear in or near a scar with suspicion lest ultimately they may become malignant, however innocent they appear to be. When there is a recurrence, the second growth is more rapid than the original one.

Sir WILLIAM MILLIGAN: Is the tumour keloid in structure? The importance of the case is from the practical point of view. My experience is that if one removes a keloid it returns, and generally becomes worse than before. Keloid in the neighbourhood of the ear is a disappointing condition with which to have to deal.

Mr. HERBERT TILLEY: Some twenty years ago a patient of mine had a very extensive keloid after the mastoid operation, and the question arose many times in the subsequent years whether it should be removed. Ten days ago, however, it was impossible to see any keloid in that patient, but its place was taken by a widened scar, as opposed to the usual narrow linear scar. I think it is wiser not to operate on keloid. As an alternative treatment I would suggest radium; we have had many

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., March, 1916, p. 91.

cases of keloid at the Radium Institute, and I know of no pathological condition for which radium is more successful than in a case of keloid.

Mr. MOLLISON (in reply): For a keloid it had a very narrow base: one could not tell whether it started in the scar or not; probably it must have done so. Re-operation has since been performed on the mastoid, and the meatus is already tending to contract so much that gauze cannot be got into the cavity¹; I do not know whether this may be due to the same cause as the "keloid."

Audible Tinnitus in a Boy (shown at the last Meeting).²—
W. M. Mollison.—Since he was here the boy has been operated upon for removal of his tonsils and adenoids, but the tinnitus continues. His tubes have been inflated without causing any alteration in his tinnitus.

Dr. H. J. BANKS DAVIS: At the last meeting I saw Mr. Lake compress the carotid and stop the noise; but when the pressure was withdrawn the sound returned, which seems to point to a vascular condition as the cause. It would be interesting to ascertain whether the noise stops when the boy is under an anæsthetic. That would settle the point as to whether it is a "habit" or not.

Mr. E. D. DAVIS: Two months ago I had a case in a Belgian, who produced the noise by contraction of the temporal muscles. I taxed him with it, and told him that it was of no importance.

Mr. CLAYTON FOX: On nipping the boy's nostrils and making him blow out his cheeks to fix the soft palate the noise ceased, so possibly it was caused by the contraction of the tensor palati.

Dr. DUNDAS GRANT: I had a similar case, in which the noise ceased when I passed a Eustachian catheter and bougie. I think the noise was due to sudden separation of the glutinous walls of the Eustachian tube. It remained absent for some minutes, and then recurred. I think this should be treated as a nerve condition, being, in my opinion, of the nature of a habit spasm.

The PRESIDENT: If the case is of the nature of *tic convulsif* the outlook, according to some authorities, is not satisfactory, for such cases are said ultimately to develop mental trouble.

Mr. SYDNEY SCOTT: Last September I saw a patient, with normal hearing, who appeared to have voluntary control over the tensor tympani muscle. She was a lady with an extraordinary neurotic family history and was personally extremely introspective. I could hear a sound through the auscultatory tube which corresponded with the patient's effort to move the drum of the ear. I was able to exclude jaw movements, and could actually see a change in the direction of the light reflex from the membrane which indicated movement. During the apparently increased tension of the membrane, the lowest tones on the Bezold-Edelmann series were inaudible. At first the control was experienced in the right ear only, but after practice the patient was able to produce the same effect in the left ear. The examination was made with eyes closed, and the signs were repeatedly consistent with the patient's statement of her sensations.

Mr. MOLLISON (in reply): My assistant and I have looked at the palate repeatedly, but could not see a trace of movement. The noise stops momentarily when the patient opens his mouth wide. I see no reason why it should not be caused by the contraction of the tensor tympani.

¹ Note.—March 18: The cavity was completely dry.

² See JOURN. OF LARYNGOL., RHINOL., AND OTOL., March, 1916, p. 91.

Sections through the Footpiece of Stapes from the Case of Otosclerosis shown at the last Meeting.¹—A. A. Gray.—The sections are from four cases of otosclerosis of one year's, three years', twenty-five years', and sixty years' duration.

In the first of these the change in the bone was different from the ordinary otosclerotic changes; there was only absorption of bone, no deposit of it, so that the diseased parts scarcely stained at all. All that was left were a few blood-vessels and broken-down bone cells. The patient had fairly advanced phthisis, which may account for the absence of deposit of bone.

The second case was also the subject of phthisis, but it was not advanced. Here the new-formed bone stained deeply, and was sharply defined; there was no fixation of the stapes.

In the third case the stapes was united by bone from the anterior margin to the oval window. The bridge of bone which united the stapes to the oval window was exceedingly fine. It was not one-tenth part of the diameter of the cross-section of the footplate of the stapes.

The fourth case was that of an old lady, aged eighty. Rarefaction in one portion of the wall of the labyrinth had gone so far that there was practically no bone left. Osteoclasts were absorbing the bone. Manasse was of opinion that the bone is not absorbed by osteoclasts but by simple pressure.

An interesting feature in all the cases is the position of the anterior line of demarcation. It was almost identical in all of them, despite the great differences in the duration of the disease. I think it is a mistake to suppose that the bony changes are necessarily progressive. There was no sign of inflammatory activity in any of the sections. There was no evidence of change in the organ of Corti, nor in the ganglion spirale, except for the ordinary *post-mortem* changes. I am satisfied, however, that there is a change in the nerve structures, but our methods are not sufficiently refined to enable us to detect them.

Dr. DUNDAS GRANT: Sometimes the clinical conditions and the tuning-fork responses are not typical, and yet the osteoporotic changes are found *post-mortem*. I should like to know whether Gellé's test was tried, and whether there was raising of the lower limit of audition.

Histological Preparations of the Labyrinths and Tympana of a Soldier suffering from Deafness due to a Bullet Wound of the Vertex of the Skull.—Sydney Scott.—C. T.—, aged forty-two, a private in the Lincolnshire Regiment, was wounded on November 13 near Ypres, and died in France from meningitis on December 14, 1914. The autopsy showed the fracture was confined to the vertex of the skull. The histological examination reveals extensive intra-tympanic hæmorrhage on the right side. The serial sections demonstrate that the tympanic membrane, the footplate of the stapes; the annular ligament, and the membrana secundaria are perfectly intact and there is no hæmorrhage within the labyrinths.

Clinical notes.—The patient was admitted into the base hospital three days after being wounded; he was able to walk, was quite rational, but very deaf. He remembered being wounded, and stated he was standing in a trench at the time; when hit he fell down, and noticed loud buzzing noises in the ears immediately, with deafness. There was a lineal suppurating wound of the scalp 3½ in. long over the right parietal bone,

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., March, 1916, p. 92.

running from the lambda to the parietal eminence. The X rays showed comminution and fissured fracture of the skull beneath the wound. There was no paralysis of the face or limbs, and the superficial and deep reflexes were normal.

Ears.—Some cerumen was present in both ears, but no blood or clot or cerebro-spinal fluid. The tympanic membranes were normal, but the light reflex on the right side was dark blue, an appearance which suggested the probable presence of blood in the tympanic cavity.

For several days after admission he could only hear shouting close to his ear, then he improved somewhat and could hear an ordinary clear voice about a yard away. He always spoke loudly, as if he could not hear his own voice.

	Right ear.	Left ear.
Edelmann-Galton whistle,	2.5 × 0.8 mm.	4.5 × 0.8 mm.
No. 473	= 19,000 d. v.	= 13,920 d. v.
Tuning-fork, 256 d. v.	Rinne neutral	Rinne negative
	Schwabach — 6 sec.	Schwabach — 2 sec.
Watch normally heard at	Just audible close to but not touching either auricle.	
3 or 4 ft.		

Unfortunately, owing to the lack of instruments, we do not know what the low tone-limit was.

A fortnight after admission the patient became hemiplegic on the left side. The skull was explored, and fragments of the fractured parietal bone removed. A small tear in the dura mater was discovered, and some bone splinters were removed from the superior parietal lobule between the angular gyrus and the great longitudinal fissure. The hemiplegia was not relieved, and the patient succumbed to meningitis a fortnight later.

The necropsy showed extensive softening of the right cerebral hemisphere. The pia-arachnoid over the external and mesial surfaces of the right hemisphere were infiltrated with pus, which was limited to this region. There was no basal meningitis, and no fracture of the temporal bones or base of the skull. The temporal bones were fixed in formalin and decalcified with nitric acid, and embedded in celloidin in the ordinary way. The sections, which are arranged in series, were stained with iron hæmatoxylin, and show extensive blood-clot throughout the right tympanum, and only traces of blood-clot in the left tympanum.

The PRESIDENT: We have to thank Mr. Scott for showing us those sections, beautiful as his always are. Why is it that the hæmorrhage came into the tympanum without any sign of injury in the deeper parts?

Sir WILLIAM MILLIGAN: I should like to ask Mr. Scott why this patient was not operated upon a fortnight before the case actually was? I should have thought, from a general surgical point of view, immediate operation was called for; he ran every risk of having septic meningitis of his vertex. In regard to the deafness, I cannot understand how a patient who has a hæmorrhage into one tympanum and an intact labyrinth could be so deaf as the tests show. I ask whether there has not been some disturbance in the interior of the cranium which accounted for the profound deafness; whether the cortical centres for hearing were not injured by a commotio cerebri.

Dr. DUNDAS GRANT: In support of what Sir William Milligan has said, the tuning-fork on the mastoid was diminished to — 6 sec. on one side and — 2 sec. on the other. In the right ear the Galton whistle was

heard at a higher pitch than in the left (apparently normal) ear. I therefore think there is justification for supposing there was some disturbance of the auditory centres. I have had at least one case in which deafness followed shell concussion, with similar hæmorrhages on the surface of the membrane. There were hæmorrhagic bullæ, which discharged into the meatus, from which came a discharge of blood. In some of the septic cases there has been previous traumatic rupture of the membrane, and infection has followed on account of the circumstances in which the patient was placed.

MR. MOLLISON: In answer to Sir William Milligan, surely it is not necessary in the case of a man who has had a head injury to suppose he has necessarily anything wrong with his cortical areas because he has a high degree of deafness? This man had been exposed to shell shock, and had had a bullet wound of the scalp. I myself—and, no doubt, Sir William also—have seen men in whom complete deafness has resulted for a time from a wound in the head which had no relation whatever to the ear. Recently I saw an officer who was shot through from the right temporal region to the left malar bone; he was completely blind and deaf. But, during three or four weeks, his blindness gradually passed off and his hearing was restored; he could hear an ordinary conversation without trouble. These sections are of great interest as showing there is nothing wrong with the labyrinth, but it is unfortunate that they do not shed any light on the causation of cases of deafness from shell shock.

DR. KELSON: The interest of the case is increased by the fact that there is no fracture of the base of the skull. Probably Mr. Scott has noticed that many patients who have been shot about the face or jaw speak often spontaneously of a discharge from the ear which commenced after the injury, and has persisted ever since. This occurs too often to be a mere coincidence; I think we must consider these as injuries due to indirect violence.

SIR WILLIAM MILLIGAN: I was not referring to the psychic cases of deafness in which there had been no injury to the skull. I have seen many cases of profound deafness due to shell shock, and have found the most severe deafness in men who had been buried for the time being.

MR. J. F. O'MALLEY: The tests show the deafness here to be of the middle-ear type, although emphasis has been laid by some speakers on it having been a nervous injury. It is not due to shell shock. With regard to the deafness sometimes mentioned by soldiers who have had wounds of various parts of the head, my experience has been that many of them have evidence of old ear lesions. I have notes of several who manifestly have had loss of tympanic membrane, dating, perhaps, from a serious lesion in early childhood, and although the deafness preceded the injury, it only assumed importance afterwards.

MR. SYDNEY SCOTT (in reply): The records of this case are too fragmentary to show what was the cause of the bilateral deafness. The damage to the right cerebral hemisphere should be taken into account. The chief feature of the case is that an injury to the vertex of the skull was associated with hæmorrhage into one middle ear without any fracture of the base of the skull, or of any injury to the tympanic membrane, labyrinth, membrana secundaria, or stapes. The source of the hæmorrhage cannot be found in any of the sections (of which there are about 200 in series on each side). Considering all the circumstances of the case, it is doubtful what would have been the result of an earlier intervention.

Removal of a Piece of Shell from the Cerebellum of a Soldier wounded at Ypres.—**Sir William Milligan.**—The piece of shell (specimen shown) passed through the auricle, cut a groove in the soft tissues, and entered the anterior portion of the left cerebellar lobe. Severe hæmorrhage resulted, possibly from the lateral sinus. When seen a suppurating sinus led down to the foreign body. Removal was easily effected and complete recovery ensued.

Tuberculous (?) Septic (?) Meningitis following Chronic Suppurative Otitis Media; Operation; Repeated Lumbar Punctures; Prolonged Illness; Recovery.—**Sir William Milligan.**—Male, aged twenty-seven, admitted to the Manchester Royal Infirmary (Throat and Ear Department) on December 28, 1914, complaining of discharge from left ear, violent headache, and vomiting.

Previous History.—Had severe attack of broncho-pneumonia as a boy, followed by pulmonary tuberculosis. In February, 1912, had a second attack of right-sided pneumonia, followed by extensive breaking down of the lung and formation of a large apical cavity. Enormous quantities of secretion were expectorated. Shortly before this second attack of pneumonia the left middle ear had become infected and had discharged freely. In November, 1914, he joined the R.A.M.C.; he was sent to Southport and was vaccinated there. Was very much upset by vaccination (?), violent pain in the head and profuse discharge from the ear. Was sent home. Discharge from ear profuse, violent headache, vomiting, dull lethargic condition, gradually deepening into semi-unconsciousness. Admitted to Royal Infirmary on December 28, 1914. Temperature 99° F., pulse 80, respirations 23. Left-sided facial paralysis, pupils unequal. December 29: Complete post-aural operation and decompression over temporo-sphenoidal and cerebellar areas. December 30: Evening temperature, 104° F. December 31: Mid-day temperature, 99.5° F.; evening temperature, 102° F. Retraction of head; severe headache. Kernig's sign present; patient delirious, very noisy; swore immoderately when touched. Lumbar puncture performed: fluid under pressure; very turbid. Report *re* cerebrospinal fluid: "The fluid contains pus; no tubercle bacilli or other organisms found. Culture yields no growth of organisms. The condition may therefore be tuberculous. Ice-bags applied to head. Urotropine, 20 gr., every four hours. During the following ten days repeated lumbar punctures; fluid still turbid. January 11: Condition critical; saline enemata with brandy. January 14: Temperature came down from 102° F. to 98.4° F.; pulse from 138 to 120, and respirations from 36 to 24. Temperature remained about normal until January 19, when it went up to 101° F., pulse 112, respirations 32. Repeated lumbar punctures. From this date a gradual improvement set in. February 7: Morning and evening temperature normal; patient rational. February 22: Patient allowed out of bed. March 8: Wound healed; complete epidermisation of antro-tympanic cavity. March 16: Discharged. Patient has remained well; his mental condition good; pulmonary symptoms not so marked. Attention is specially drawn to the value of repeated lumbar puncture.

Mr. J. F. O'MALLEY: I would add a third query to the two propounded in the title—namely, as to the possibility of epidemic cerebrospinal meningitis. I have now had a case for several weeks, and the patient was under my care before the present attack, as three months ago I removed an aural polypus from him. He had a rash. The cerebrospinal fluid was examined the second day of the disease, and though pus

was found there were no organisms after three days' incubation. This was so until the eighth day, when no organisms were found by direct examination by two bacteriologists, but there were two colonies of meningococci on culture. The early symptoms of Sir William's case and mine were almost identical, except that my patient did not vomit, but had headache all the time. The medical officer at the isolation ward was very expert, and felt confident about the diagnosis, though it was suggested by the bacteriologist that the rash might be septic. As the cerebrospinal fluid finding was so often negative it was thought it might be otitic meningitis. Lumbar puncture is performed on alternate days, and the patient is recovering.

Dr. H. J. BANKS DAVIS: I do not think a patient who appears to have been so ill could live with cerebrospinal meningitis from December 31 to March 16, and the history is against this diagnosis. As a rule, when extremely ill, the patients succumb to cerebrospinal meningitis within a week or ten days.

Mr. SYDNEY SCOTT: Was there any evidence to show whether the infection was from the ear, and if so was it by the translabyrinthine path? I recollect a child who died of meningococcal meningitis after pneumonia, from whose tympanic cavities two kinds of organisms (on each side) were isolated—namely, intracellular cocci and capsulated extracellular cocci, the first corresponding to the meningococcus which had been isolated from the spinal fluid during life, and the second resembling pneumococci.

The PRESIDENT: I presume the pus from the case was not injected into a guinea-pig, as that might have solved the problem as to whether it was a case of tuberculosis?

Sir WILLIAM MILLIGAN (in reply): It never occurred to me that the case might be cerebrospinal meningitis; I regarded it as an ordinary septic case, and expected that an organism would be found. Only two bacteriological examinations were made, and no organisms were found. Still, I should be rather sceptical of its being cerebrospinal meningitis; there was no rash. The other day a case was sent in with symptoms of meningitis, and I diagnosed septic meningitis; but when the fluid was reported on by the bacteriologist, he said he had discovered one single meningococcus. I expressed my doubt as to that being sufficient to support a diagnosis of cerebrospinal meningitis, and it proved later to be an ordinary septic case. I do not know what the path of infection in this case was: it was not the labyrinth; it was a pure middle-ear case. What ought we to consider septic meningitis? Is the presence of this established without demonstrating organisms? I have been in the habit of rejecting the diagnosis unless organisms are found. With regard to injection of material into a guinea-pig, I still do that occasionally, but did not do so in this case. I do not think the decompression did him much good; what I regarded as most beneficial were the repeated lumbar punctures which kept the intracranial pressure down, thus preventing death from compression of his own vessels and respiratory paralysis.

Malignant Disease of Middle Ear following Chronic Suppurative Otitis Media; Extension to Mastoid Cells; Operation; Rapid Recurrence; Employment of Radium; Temporary Relief.
—Sir William Milligan.—J. B—, male, aged fifty-eight, seen on April 3, 1913, suffering from right-sided suppurative middle-ear disease of many years' duration. Right ear discharging freely; perforation of

posterior segment of membrana tympani; polypus; slight tinnitus; no vertigo. April 7, 1913: Polypus removed; chromic acid applied. June 5, 1913: Ear quite dry; perforation not healed. July 8, 1914: Recurrence of polypus—rather vascular. July 21, 1914: Removal of polypus; malignancy suspected, but not proved microscopically. August 6, 1914: Discharge slight, but fœtid; slight hæmorrhage. Antiseptic treatment ordered. March 8, 1915: Radical mastoid operation; granulation tissue very vascular. April, 1915: Antro-tympanic cavity unhealed; definite microscopic evidence of malignancy. May, 1915: Post-aural cicatrix broken down; fungating granulation tissue; slight pain; no glandular involvement. July, 1915: Patient losing weight; several fairly severe attacks of hæmorrhage from ear; slight enlargement of glands; severe pain. August, 1915: Radium emanation tube (25 mgrm. element) inserted into fungating mass. September, 1915: Pain and hæmorrhage much relieved; growth shrinking; free discharge from the meatus. November, 1915: Growth half its former size; recurrence of pain; glandular involvement greater than before; facial paralysis. Radium emanation tube (25 mgrm. element) again inserted. December, 1915: Local relief, but systemic decline; evidence of toxæmia. January, 1916: Patient much weaker; no great alteration in local condition. February, 1916: Patient rapidly losing ground; glandular involvement about the same; no increase of local growth, but progressive loss of strength and weight. Condition hopeless.

The PRESIDENT: I think cancer arises more frequently in, and is more common in, a suppurating middle ear than in an ear which is not so affected. I saw a case in which a growth was deep in the meatus there was no suppuration, and it was secondary to malignant disease in the breast. Radium was employed, and the growth completely disappeared and did not return; but the patient died of a lesion in the lung, secondary to the breast cancer.

Sir WILLIAM MILLIGAN (in reply): With regard to a remark made by a member as to radium increasing pain, my experience has been the opposite—namely, that it relieves pain. It also stops the hæmorrhage, which is a very important point. I do not know who made the report on radium to which reference has been made. Its action in cases of sarcoma is extremely beneficial, but in carcinoma its benefit is doubtful. However, we are only just beginning to understand about the action of radium, which is generally used only in the cases which are otherwise hopeless; it has never had a proper chance in cases which we speak of as operable. To condemn radium at the present stage is absurd. Radiologists seem to agree that embedding is the best way in which to use it.

The Significance of Unilateral Sero-mucous Catarrh of the Middle Ear in Persons over Middle Age.—Sir William Milligan.—Unilateral sero-mucous catarrh of the middle ear in persons over middle age should always be regarded with suspicion. A diagnosis of simple catarrh is often made and is just as often wrong. Some incipient malignant process or syphilitic manifestation should always be thought of, and a guarded prognosis given.

In many cases malignant ulceration of the naso-pharyngeal mucosa or a malignant growth of the basi-sphenoid is discovered if careful rhinoscopic examination is made, or some syphilitic process is found to be the underlying fact in the case.

A careful rhinoscopic examination by mirror or naso-pharyngoscope should be made as a matter of routine in all such cases, and frequently leads to important and far-reaching clinical discoveries.

Mr. TILLEY: I wish to support emphatically what Sir William Milligan has said. In the last fifteen years I have seen eleven cases of endotheioma of the naso-pharynx, and one of the saddest of these I saw three years ago. The patient had seen two well-known aural surgeons in this country, and three on the Continent. He complained of deafness, which varied in degree, and he was told it was catarrhal deafness. One surgeon catheterised him every week for two months. I saw him rather late in his illness, when one nostril was blocked, and there was a bluish, congested-looking mass in the naso-pharynx. It eventually invaded his skull, and he died of cerebral symptoms and in great pain. In these cases, when the deafness has been present for a matter of weeks, you generally find some difficulty in the movement of the levator palati on the same side; this is due to mechanical impairment rather than to a nerve lesion. Then follows anæsthesia of the second division of the fifth nerve, evidenced by loss of sensation on the outside of the lower jaw and over the lower portion of the cheek. This anæsthesia and the weakness of the levator palati are almost pathognomonic of the condition. If in such a case 100 mgrm. of radium are embedded for twelve hours, it is extraordinary how the condition will disappear. Last week I saw a man in whom the growth was as large as the end of one's thumb, and the patient could not blow down the right nasal fossa. Radium was embedded a month ago, and when I saw my patient last week no trace of the growth was to be seen; the nasal breathing was free, and the pain in the temporal region had disappeared.

Dr. DAN MCKENZIE: Possibly the reason why these cases are overlooked by those who see the patient earlier is that the growth is not then sufficiently large to be visible by the post-rhinoscopic mirror; therefore all cases of deafness should be examined with the naso-pharyngoscope as a matter of routine. Such cases would not be missed by this means, even at the earliest stage.

Dr. JOHNSON HORNE: I have always practised and taught a routine examination of the post-nasal space and of the posterior nares with a mirror wherever it is possible, in all cases of diseases of the ear, the nose, or the throat. The importance of that practice and of that teaching has been fully established not only by the clinical surprises from time to time observed and by the aids to diagnosis afforded, but also by the calamities at times thereby prevented.

Mr. SYDNEY SCOTT: It is sometimes difficult to decide whether some cases of middle-ear catarrh are secondary to malignant disease or to syphilis. Last November I saw a patient at the National Hospital for Paralysis, who for six months previously had been treated at another hospital for unilateral middle-ear catarrh and Eustachian obstruction. He then developed optic neuritis and paralysis of the left sixth and seventh cranial nerves. The left eighth cranial nerve was unaffected. In the naso-pharynx was an ulcer which involved the infundibulum of the left Eustachian tube; it looked like malignant disease, but the nerve lesions pointed to syphilis. (I shall refer to this case more fully another time.) More recently I saw another patient whom I had examined three weeks previously, and found nerve deafness in the right ear. During the interval he had awakened with loud tinnitus and great deafness in the left ear, which had been previously normal. I found the signs of nerve deafness with great loss of bone conduction and of high and low tones,

but the left Eustachian tube was impervious even to bougies. His history of syphilitic infection was very definite; he had been treated intramuscularly with salvarsan two years ago, followed by a course of mercury for one and a half years. A week later I found the Eustachian obstruction had gone, the membrane returned to the normal, but the hearing was still worse.

Cases illustrating Otogenic Facial Paralysis.—Dan McKenzie.

—**CASE 1:** *Post-operative Paralysis.*—Male, aged twenty-nine, shown before this Section on October 12, 1912, after recovery from lateral sinus thrombosis and serous meningitis, for which translabyrinthine drainage had been adopted. The patient had two operations in all. At the first a huge cholesteatomatous cavity was disclosed, in the depth of which the facial nerve was found slung across the space like a thread and devoid of all bony protection from the genu to the stylo-mastoid foramen. But no paralysis was observed until several hours after the second operation, at which the labyrinth was penetrated to reach the internal auditory meatus, so that the injury to the nerve must have been inflicted during this procedure. The course of the paralysis since its inception illustrates the striking tendency to recovery, but often only to partial recovery, manifested after severe injuries to the nerve in the temporal bone. For six months no change could be detected in the face, but at the end of that period a little fibrillary movement in the fibres of the orbicularis palpebrarum was perceived when the patient was made to close the eyes tight, and the improvement has gone on continuously, but very slowly indeed, during the three years that have elapsed since then. Now he can close the eye, the ala nasi shows movement, and the naso-labial fold appears when he smiles. But none of these movements is equal to that corresponding to it on the other side of the face. The patient himself is of opinion that the improvement is still continuing, and with this I agree, but progress is extremely slow. The reaction of degeneration has never been present.

CASE 2: Male, aged thirty-two, shown before this Section on May 14, 1915, as a case of recovery after purulent meningitis. In this, as in the first case, translabyrinthine drainage was effected, but the paralysis was observed on the patient recovering from the anæsthetic. The first sign of recovery was seen on December 17, 1915, thirteen months after the operation, in slight movement of the orbicularis palpebrarum, the dilator naris, and the levator anguli oris. The improvement, in this case, unlike the last, is proceeding rapidly.

CASE 3: *Concussion (?) Paralysis.*—This case is included in the series, as it seems to suggest the explanation of facial paralysis following mastoid operation in which no sign of exposure of the nerve at the operation has been detected. A male, aged twenty-five, received what was supposed to be a shrapnel wound of the mastoid on May 1, 1915. He was rendered unconscious for a couple of hours, but no facial paralysis was noticed until two days later, and in four weeks the paralysis began to get well. There is now no sign of it. A small fragment of metal which had lodged in the tympanum was removed by the exhibitor eight weeks ago, by means of a radical mastoid operation, and the route of the missile was then seen to pass through the mastoid and the posterior meatal wall close to the tympanum, and within a few millimetres of the Fallopian canal. As far as could be made out the nerve itself had not been exposed.

CASE 4: *Paralysis from Otitis Media Purulenta.*—Woman, aged

thirty-two, who came to hospital with chronic suppuration in the left ear and complete facial paralysis of the corresponding side of the face of one week's duration. The radical mastoid operation revealed cholesteatomatous disease, which had exposed the facial nerve for about $\frac{1}{4}$ in. in the tympanum. The facial paralysis began to improve six months after the operation, but in this case, as in the first, complete recovery delays its coming.

CASE 5: *Herpetic Paralysis*.—Male, aged thirty-two. This case was published in *extenso* as one of herpes zoster oticus combined with recurrent laryngeal paralysis in THE JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY (September, 1915, p. 339). It is now shown here with the facial paralysis nearly well. (The laryngeal paralysis lasted a few days only.)

CASE 6: *Paralysis from Otitis Media Catarrhalis*.—Boy, aged eight. After an attack of acute pain in the right ear, facial paralysis suddenly appeared. There has been no discharge from the meatus. When first seen on December 8, 1915, the membrana tympani showed some dull redness in the upper hemisphere, but it did not rupture. There was no herpes. Consequently this is evidently one of those rare instances of paralysis from simple catarrh of the middle ear, several cases of which have been shown before this Section. The paralysis is rapidly recovering, having been complete for a month only.

The most important cases of facial paralysis from the surgeon's point of view are, of course, those which follow mastoid operations. In my experience, severe facial paralysis from this cause is very rare, and when it does occur it nearly always undergoes great improvement, if not complete recovery, sooner or later. Years, indeed, may elapse—according to Vohsen as much as ten years—and yet recovery take place. I suggest that the reason for recovery, after even complete section of the nerve, lies in the fact that in the facial nerve, passing as it does through a fine canal in the bone, section may occur without the ends of the nerves being separated from each other, and as the intervening gutter or bridge of bone may be assumed to serve as a guide to the sprouting nerve fibres, their ultimate union is probable. On the other hand, as the cases now exhibited show, complete recovery may be delayed for a very long time; indeed, it may never be reached. This, also, I ascribe to the narrow channel through which the nerve passes. If the nerve is severed the scar tissue which forms will block the passage and prevent the full reunion of the nerve.

I have said that in my experience, and I believe in all otologists' experience, complete facial paralysis from operative trauma is extremely rare. On the other hand, I find paresis to be relatively common. This paresis varies in severity. In the mildest cases a slight lagging behind, or delay in closing the corresponding eyelid as compared with the movement of the opposite eyelid in the ordinary action of the involuntary winking of the eyes, is all that appears, and it is so slight as to escape all except the most jealous observation, and so transient that it is visible for but two or three days only. Then there are the more obvious and familiar cases, in which the paresis slowly spreads from the eyes to the rest of the face, and after four or five weeks slowly disappears. In many of those cases the surgeon is prepared for the paralysis by the appearance of a facial twitch at the operation. In others, again, no warning has been given, and the paralysis comes as a surprise. It is in such cases that I suggest concussion or contusion to be the cause of the nerve lesion—by contusion I mean rather hæmorrhage into the

canal—the effects of which are not immediately apparent after the operation. Case 3 illustrates this type, and I can recall another in which the paralysis followed the use of a blunt set of chisels at the operation.

When the nerve is exposed by natural dehiscence in its bony envelope, or by caries of the bone, post-operative paralysis, when it appears, is probably due to septic or traumatic neuritis. It appears about three days subsequent to the operation, lasts about six weeks, and finally gets well.

We frequently come across cases at which a twitch during the operation reveals the exposure of the nerve, but in which, for some unknown reason, no paresis or paralysis ensues.

In the radical mastoid operation one great difficulty we have to contend with is to clear disease from the posterior or postero-external wall of the tympanum (the sinus tympani), where caries often lurks. Curetting here is liable to injure the nerves, and yet to neglect this corner is to run the risk of prolonging the disease and losing the benefit of the operation.

THE PRESIDENT: This question of facial paralysis is a very practical one. I have had my share of cases of post-operative facial palsy. I had one case in which the nerve had been exposed by cholesteatoma, and the operation was the ordinary radical mastoid. In these cases I have found that the quicker the suppuration ceases, the quicker is the repair of the nerve. That is what one would expect on *à priori* grounds.

DR. H. J. BANKS DAVIS: In the first case the note says: "The reaction of degeneration has never been present." I suppose that this is an error and means that it has always been and is still present. I think it is there in every case of paralysis after the first week or ten days following injury to the nerve below the nucleus. It may, of course, only be "partial reaction of degeneration" and not complete, but the responses to electrical stimulation cannot be normal if facial paralysis is present, unless it be "functional."

DR. DUNDAS GRANT: I wish to support what Dr. McKenzie says with regard to the jamming of the nerve by cicatricial tissue in the tube. I would remind you of a paper which was read by Ferdinand Alt at the International Congress in London in 1913. It was on old-standing cases of facial paralysis which he had operated upon by deliberately opening the Fallopian canal, and liberating the facial nerve from the pressure. I should feel some diffidence in doing it, but there may be others who have experiences of the kind to offer. I agree it is very rare for the paralysis to remain complete for any great length of time. I think, with Dr. Gray, that recovery is hastened by using the continuous current. I should like to hear what results have been obtained by the anastomosis of the facial nerve with one of the other nerves. I have not had the opportunity of seeing the ultimate results of that procedure; operators do not seem anxious to record them. In opening the aditus I use a guard, and I think it has helped me to avoid facial paralysis. But the guard must be held by an experienced person, otherwise it may defeat its object, especially if there is anything like dehiscence in the canal. Anatomical investigations have shown that the course of the facial nerve varies; in some cases it runs vertically downwards from the inner wall of the aditus; in others it runs for some distance horizontally outwards, and then makes an almost right-angled turn downwards; and in the latter cases it is specially liable to injury. By careful operating one can chip off the corner of the bend without cutting through the facial nerve.

In using the chisel, I find it best to turn the bevel of it over, so that the tendency is for the tool to work towards the surface rather than the deeper parts. I ask whether it is common for the facial nerve to be affected when translabyrinthine drainage is carried out. It is such a fascinating procedure that one would like to be assured it is free from that risk. Of course, a freer drainage can be secured by making an opening in another place, though the ensuring of asepsis is then probably more difficult.

SIR WILLIAM MILLIGAN: If Dr. McKenzie will do me the honour of reading Milligan and Wingrave on "Diseases of the Ear," he will find a chapter devoted to facial nerve paralysis. I rise, however, to draw attention to the injury which is often done by curetting the middle ear. If it is to be done at all, it should be carried out from behind forwards; it is then less risky. If, unfortunately, one divides the nerve in the course of an operation, one should have the courage to open up the aqueduct immediately as far as possible, and endeavour to twist a little piece of foil or indiarubber tissue round the nerve, so as to conduct it to the distal opening in the bone, and so encourage repair. I have seen two cases of bilateral facial paralysis in middle-ear disease. I agree that there is generally some recovery in these cases, and the lapse of years does not make the case hopeless. It is rare to find a patient suffering from absolute and permanent palsy of the nerve. We in this country do not see anything like so many cases of this kind as are to be met with in many Continental clinics.

DR. JOHNSON HORNE: I agree with what has been said about the importance of care in curetting the middle ear in the mastoid operation, and apart from any mastoid operation I would urge particularly the advisability of confining all curettage of the middle ear to patients indoors and in bed. Referring to Dr. Grant's point about reversing the chisel when removing the bridge in the mastoid operation, so that the bevel of the chisel is on the under surface, at that stage of the mastoid operation I work with a curved chisel with the bevel on the under surface. With the use of that instrument and Hartmann's punch forceps I have always escaped injuring the facial nerve. Apart from traumatism, there have been cases of ear disease in which facial paralysis was inevitable, such as tuberculous disease of the ear.

MR. SYDNEY SCOTT: We do not find that facial paralysis always follows the translabyrinthine operation for meningitis,¹ although it occurred on the third day in the first case Mr. West and I described. One should be specially careful to keep close to the floor of the internal auditory canal.

DR. DAN MCKENZIE (in reply): I will not reply at length at this hour, but suggest the subject for a discussion at another session. Unless you eurette the ear very thoroughly in some cases, you will not get it to heal up. And in the cases of caries in the posterior part of the tympanic cavity, the spot where the nerve is most liable to be exposed and where facial paralysis is produced, one must always eurette there if the case is to be cured. I think we should decline to remove a polypus from the middle ear except through the mastoid. I have twice seen a polypus attached to the exposed trunk of the nerve, and if it had been removed in the ordinary way, facial paralysis would have been inevitable.

¹ *Proc. Roy. Soc. Med.*, 1908-9, ii (Otol. Sect.), p. 11.

PROCEEDINGS OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION.

Held in Atlantic City, New Jersey, May 25-27, 1914.

(Continued from p. 65.)

Endonasal Operation in Tumour of the Hypophysis—Report of a Case in a Female, aged nine.—T. H. Halsted.—The patient first seen February 6, 1914. The prominent symptoms were adiposity frontal headache, impairment of sight, tiring very easily, muscular fatigue, marked ataxia, dizziness, intention tremor, extreme difficulty in making co-ordinated movements. Skin dry and coarse, hair black, coarse, growing low on forehead. She was mentally acute, described as being almost brilliant. There was an increased tolerance for sugar, no glycosuria after 200 grm. glucose, slight pyrexia. The eyes showed $\frac{6}{9}$ + each eye, sight occasionally obscured, fields normal for form of each eye, colour fields normal. Pupils large, in dark room no reaction to light, but in very bright light moderate change. Reaction with convergence normal. Muscle balance normal.

Patient is short, thick-set for her age, tendency to adiposity, particularly about hips and abdomen, facial expression flat and ironed out, well marked general ataxia, marked choreiform movements, marked athetosis, decided intention tremor, some deafness, but not persistent.

X-ray examination—stereoscopic plates—showed sella turcica somewhat larger than normal, bony outlines irregular and not as clear-cut margins as other outlines in this area. Above and posterior to sella is a brain area of lessened density, fairly well defined, the antero-posterior diameter one and one-half inches, vertical about one inch. This area seems to surround the sella turcica, the interpretation being a soft growth, possibly a cyst, surrounding and pressing upon the pituitary body. The diagnosis was a cyst either of the hypophysis or a neighbourhood cyst pressing upon the hypophysis, the optic thalamus, corpora quadrigemina and contiguous regions forming the interpeduncular space.

Preliminary operation March 13, 1914, upright position, cocaine, adrenalin. Removal of both middle turbinates and exenteration of right anterior and posterior ethmoidal cells.

Second operation, anaesthesia, local, submucous resection of the septum. The entire septum, vomer, perpendicular plate of ethmoid and the rostrum of the sphenoid were removed. Anterior wall of both sphenoid and sphenoidal septum removed.

Nineteen days later third operation, posterior third of the soft, bony septum removed, then the bony sella, the dura incised, and there was an immediate gush of more than a half ounce of yellowish fluid.

During the week following the last operation there was a very marked change in her condition for the worse. Frontal headaches increased, shrieked a great deal, much stupor, dull, apathetic, involuntary urination, polyuria, two tonic convulsions, pulse irregular and thready, respiration at times slow and of Cheyne-Stokes type. At end of a week, following the convulsions, gradual improvement began, a very marked improvement in the ataxia and athetoid movements being first noticeable, pupil contracting, headache less, but there was a decided change for the worse in her disposition. Loss in weight and in muscular strength very per-

ceptible, involuntary micturition and defæcation. This decided change in symptoms, some better, some worse, continued for three weeks, and seemed to be due to the relief of pressure in the interpeduncular space, as shown by improved eye conditions, less headache, less ataxia and intention tremor, whereas there was seemingly now a condition of hypopituitarism instead of the hyperpituitarism when she entered the hospital. For four weeks it was noticed that her black hair was changing colour rapidly to a reddish-brown, beginning at the distal end of the hair and extending rapidly to the scalp.

She was now put on pituitary extract—pituitrin—when there began an immediate improvement in her mental condition, the child becoming bright, cheerful, singing happily, displacing the apathy and dulness following the last operation. Muscular strength showed an equal improvement. No complaint of headache. But ten days have elapsed since giving the pituitary extract and writing the report of the case—consequently, too short a time to know how much real and permanent improvement may follow the operations.

DR. LEWIS A. COFFIN: I have operated two of these cases, practically doing the same operation that Halsted has reported, excepting that I take out the posterior part of the septum instead of doing a submucous resection. I took out the rostrum and got to the sphenoidal wall in that way. They were done in two or three stages. The first case was a woman, an idiot, that was referred to me from a charity hospital, and I operated her in three sittings. She was a poor patient under cocaine, because she had no mentality, but I was successful in getting back as far as the sella. I went into her sella, and put her back in the ward. Her symptoms as to pain in the head improved, but her mentality did not. Some ten days after I had done the operation I felt more or less chagrin because I had not any of that tumour in a bottle for examination; it was a cyst, there being a gush of straw-coloured fluid. It had become so easy to go into the sella turcica that I thought I would go in with curved forceps and get some of the tumour. I put her on the table under an anæsthetic, and took Yankauer's right and left forceps, somewhat curved, and opened the sella turcica, closed my forceps, and took out what I thought was the tumour; there was a small hæmorrhage. I backed right into the opening in the sella. I put her back in the ward feeling pretty well. Two hours later the patient was not so well. She was comatose, evidently from brain pressure. I removed the packing, but she died that night. Another case was sent to me from the eye clinic of the Manhattan Hospital—a young girl of seventeen, who had complete blindness in one eye and temporary hemianopsia in the other, with extreme and constant headache. I operated under cocaine, removed the posterior half of the septum, opening the sphenoid, and took down the sphenoidal septum under cocaine. I then, instead of inserting a plate, took her up to the X-ray room, and took a periosteal elevator and slipped it into the sphenoid, and without any light whatever, and put a little adhesive around it to hold it under the X ray, and found the periosteal elevator was exactly where I wanted to enter the sella turcica. I then put her back on the table, opened the sella, could see the tumour very well indeed, but could not get any tissue. It seemed to break down, and I was not so ambitious to get any of it in a bottle as I had been before. However, just as she went back to the ward I took a curette and slipped it in, and put her back in the X-ray room and X rayed her under ether, which showed my curette in the middle of the pituitary gland. That girl improved very much, not in vision, but her headaches dis-

appeared. The interesting part is when she had gone out of my hands. She was coming to me for probably three or four or six weeks. She felt very much better. Dr. Sharp, who is consulting neurologist to our hospital, who worked for a number of years with Dr. Cushing, said we were not warranted in doing anything further for her. I was looking for a case where I could do the Frazier operation; but this was not justified in this unless her headaches returned. Her sister, however, wanted her vision improved, and took her to several other men. Dr. Elsberg, Dr. Charles A. Dana, etc., saw her in the course of time. I asked Elsberg if he ever operated her to notify me, and some two weeks later he sent me word he was going to do the Frazier operation. I went to see the operation. I was delighted with his wonderful and beautiful technique. He did not, however, remove more than the size of a grain of rice. I do not know her recent history.

Dr. CORNELIUS G. COAKLEY: I saw one case operated on of a man who was totally blind in the left eye, with hæmianopsia on the opposite side. Elsberg did the operation, a decompression, but a decompression above the optic nerves. If you are going in for decompression you have your growth below the optic nerve, and pushing the nerves upward, and here semi-classical decompression is of far more value than decompressing the lower portion of the floor of the frontal lobe. The Frazier operation is not so satisfactory as the Hirsch or Cushing, or as the regular decompression operation.

Dr. HARRY L. SWAIN: I too have seen an operation and assisted at one for pituitary tumour in the hands of a general surgeon. What impressed me was the smallness of the view of the tumour mass. The operation was done skilfully enough; the nose was taken off at the face and turned up to the forehead, and fastened with towels, and the septum taken away, set back, the sphenoid opened, and the septum between the two sphenoidal sinuses taken away, and a good operative field cleared up. When all is considered, the range of light in surgical amphitheatres is not enough for a clear view of the further wall of the sphenoid to enable one to open into the sella turcica. The first stroke of the chisel opened into the sella turcica, and enough was chipped out to enable us to look through at the cranial cavity; there was a growth, not a cyst, of organised tissue, and it was supposed to be a glioma, although this would be very rare in this situation. There was immediate improvement in vision after the operation, but on the night of the second day she developed a combination of œdema of the brain and pressure from that, with rise of temperature, œdema of the lung, and cessation of the kidney function, and died. During the first twenty-hours, while still in possession of her faculties, there was a marked improvement in vision as a result of simple decompression, because I doubt if the mass of tumour taken away in itself was sufficient to have relieved the pressure enough to improve the symptoms.

Dr. THOMAS E. HALSTED (in closing): In answer to Dr. Coffin's question, I think the field was better after the taking off of the posterior end of the septum, and, in fact, I first started to do what he had done, not the submucous resection, but I got cold feet. I knew what Hirsch had done, and thought I would stick to that operation. I am sure that the field which I got the third time, when I took out the posterior end of the septum, was better than at the second operation. I do not know regarding the comparative possibility of sepsis. This child that we thought was going to die after the second operation, developed a tonsillitis with a temperature of 103° F., and finally pulled through.

Chronic Influenza of the Nose and Throat.—**Lorenzo B. Lockard** (Denver).—At various times cases have been recorded in which influenza bacilli, either in pure culture or in symbiosis, have been found during a period of several months, and in some instances for as long as one or two years. Usually these have been cases of chronic bronchitis, pneumonia, or tuberculosis, although a few have concerned individuals with rhinitis and otitis media.

The patient whose history is recorded presents the unique spectacle of an infection of the nose and throat lasting twelve years, during all of which time cultures of the *Bacillus influenzae* have been obtainable whenever sought for, whether or not subjective symptoms of the disease were present. In 1902 he had an attack of influenza, which terminated in a peritonsillar abscess; the pus showed *Bacillus influenzae*. During the next two years three swabs from the tonsillar crypts gave similar findings. In 1909 his tonsils were removed, and after three days a false membrane appeared, covering the pharynx and pillars. A culture from this showed the bacillus. In the following two months three positive cultures were obtained. An autogenous vaccine had no effect. Three years later, following an attack of typhoid fever, there developed acute inflammation of the maxillary sinus, the pus from which gave a pure culture of the *Bacillus influenzae*. There was a second attack six months later, with the same bacteriological findings. A third attack developed the following winter, when a radical operation was performed, and again the influenza bacillus was found. Three months later an abscess appeared over the second bicuspid. This tooth and the first molar were extracted, and the necrosed portion of the floor was resected. A pure culture was obtained from the extracted tooth. Five months later the bacilli were still present. The literature fails to show a similar case, although cases of chronic infection have been described by several authors.

Bacilli are found in the throat secretions of many normal individuals, and in a large percentage of patients suffering from other diseases. In 172 normal individuals the bacillus was found 43 times, and in 427 patients with other diseases it was present in 215. Following attacks of influenza, bacilli may remain latent in the throat, bronchial tubes, or nose, and give rise to recurrent attacks in the individual, or transmit it to others. In this way may be explained the eruption of sporadic cases in non-epidemic periods. For the diagnosis of chronic influenza the finding of the influenza bacillus is not essential, as the symptoms are characteristic. No treatment aside from that which depends upon raising the resistance of the individual has been effective.

Niagara Falls, Canada, June 1, 2, 3, 1915.

Papilloma of the Larynx.—**Thomas Hubbard.**—Cases presenting complications and describing special features of surgery and general treatment were reported.

The first case was like a papilloma, but was diagnosed microscopically to be an epithelioma. Two tumours removed at different periods were pronounced malignant. The treatment was removal by forceps, followed by cauterisation, made thorough by means of a fenestrated intubation tube whereby the crystals of trichloroacetic acid were rubbed into the base without injury to the sound mucosa. No recurrence up to now, about twelve years.

A case presenting asthma as a complication was reported. The larynx was the source of the reflex which excited bronchial spasm of the most severe type, uncontrolled by morphine and adrenalin, and making operative procedures extremely difficult.

Two cases of papilloma in children were reported. Both had emergency tracheotomy. Operations by direct laryngoscopy and curettement through tube and also through the tracheotomy wound were successful. One case required a second operation in less than a year, the removal of one large papillomatous tumour giving her complete restoration of voice and no recurrence now for a year. The other case, a boy aged four, was cured in one curettement by upper and lower route. No recurrence in three years.

Papilloma of the larynx in an adult, operated thoroughly about six times in one year with active recurrence each time, was finally brought to a successful issue permanently by the aid of neck massage. This was begun one month prior to final operation, and it seemed to the operator that the operation was made more easy in that the patient controlled the larynx better than formerly. Massage was continued after removal of many small papilloma from all parts of the larynx except the inter-arytæmoid space, and at this date, now six months, there is a perfectly clear larynx. It seems to the author that massage accomplishes precisely what is aimed at in the tracheotomy: the absolute rest method advocated by Clark and others, and in a much more rational physiological manner. Normal nutrition is restored and normal functional activity is maintained. The author urges trial of massage in connection with timely operative procedures even in young children, in preference to tracheotomy and prolonged rest.

DR. J. PAYSON CLARK: I wish to take exception to Dr. Hubbard's view with reference to tracheotomy in children. I cannot agree that leaving the tube in place for a long period hinders the restoration of function of the larynx. I have had patients who have worn the tube for a number of months, and after its removal there was no difficulty in the re-establishment of laryngeal function. It seems to me to be dangerous to remove the tube in children as long as there is any of the growth in the larynx, because there is apt to be an increase of this, and one may face the problem of doing another tracheotomy, which, as is well known, is more difficult than the primary tracheotomy. I would also like to register a plea for the indirect method of laryngoscopic examination. With the invention of all the instruments for the direct view of the larynx there is great danger of neglect of the indirect method, which seems to me to be much better for adults.

DR. E. FLETCHER INGALS: I would like to ask the reader of the paper about his results with trichloroacetic acid. I cannot understand how it can be used in strong solution. Neither do I understand whether the tube, through which he did the cauterisation, was removed immediately after the operation or later. If it was removed at once, was there no swelling or trouble in restoration of function afterward? Dr. Clark says the second tracheotomy is more difficult than the first. I have not had much experience in this regard, but my recollection is that the second was the easier. I do not see why this should not be the case. In curetting the growth from below, was it done by sight—could Dr. Hubbard see what he was doing? I would also like to know whether he used an interrupted stitch in suturing.

(To be continued.)

Abstracts.

PHARYNX.

Durand (Nancy) and Gault (Dijon).—Surgical Treatment of Pharyngeal Tumours by the Buccal Route.—"Proceedings of the French Society of Laryngology, Otology, and Rhinology," May 15, 1912.

The authors observe that many patients who present themselves with, say, a small circumscribed lympho-sarcoma of the tonsil, refrain from undergoing removal by the external route and consequently allow the growth to persist, until oftentimes it becomes finally inoperable. Were the internal route suggested they would submit, and the chances of operative success would be greater. The internal route is justifiable for limited tumours in their early stage of development. With powerful illumination and thorough retraction of the tongue and cheek, the operative field is almost rendered a superficial one. To combat hæmorrhage, Rose's position must be adopted, with constant swabbing, and, if necessary, compression, with or without a special instrument, preliminary tracheotomy, etc. The authors quoted Prof. Jacques, who drew special attention to the merits of endo-buccal surgery for neoplasms about the faucial isthmus, convinced as he then was from personal experience of four cases, that if it be a little more difficult to excise a carcinoma of the palate and pharynx than an ordinary tonsil, it is not in any case much more dangerous.

In this report the authors show the possibility of making a free and complete extirpation of growths, clearly circumscribed and with or without slight glandular involvement by the oral route.

A comparison of the various methods of intervention on tumours of the faucial isthmus follows the description of thirty-one cases of malignant growths of the meso-pharynx, dealt with by a free and methodical excision *per vias naturales*. The procedure is not accompanied, as one might expect, by serious hæmorrhage; ligature of the external carotid or preliminary tracheotomy are in the majority of cases needless. The neoplasm can always practically be removed, and if not culminating in a definite cure, there is an appreciable period of survival unattended by pain. The patient is afforded physical relief and mental comfort, without being exposed to a serious danger. The authors briefly recall the various procedures of external pharyngotomy.

(A) *Difficulties: External Route*.—The multiplicity of operative methods, the number of cutaneous incisions proposed, expediency of definite or temporary resection of the mandible, seat of resection, problem of anæsthesia, indication for ligature of vessels, and after-treatment of the wound, are still matters of controversy.

Buccal Route.—The authors quote Jacques' opinion on the subject: "This procedure, obviating the long and laborious external operation, conserves the patience of the operator and the resisting powers of the patient. Moreover, aided by good illumination and with experience in oral operations, one can dissect out a very extensive tumour with precision." Anæsthesia, which at first seems to offer difficulties in the case of large growths impinging on the breath-way, can be facilitated, if necessary, by a temporary tracheotomy.

(B) *Dangers and Inconveniences: External Route*.—Operative trauma of the large vessels, vagus and facial nerves, etc., frequency of dressings, infection of the wound, ulceration of vessels, broncho-pneumonia,

local phlegmon, osteitis of the divided surfaces of the mandible, salivary or alimentary fistulæ, etc.

Buccal Route.—The chief danger which would appear inevitable is hæmorrhage, with its consequences on the air-passages, but all published cases demonstrate that it is but slight and easily controlled by compression, or, if necessary, ligature.

(C) *Results: External Route.*—Examination of statistics is not very encouraging. Krönlein, who practised lateral pharyngotomy in all his cancer cases, reports as follows:

(1) Out of 8 pharyngotomies he had 6 deaths and 1 relapse.

(2) In a series of 60 other cases 29 were operated on, 11 died as a result of the operation, and 18 survived. Of these 1 died of intercurrent disease, 1 was well two years afterwards, another remained well for seven years and then developed cancer in the opposite tonsil; recurrence took place in 15 cases.

Vallas gives the following statistics: Out of 19 pharyngotomies following mandibular resection he observed 12 recoveries and 7 deaths, 5 from broncho-pneumonia, 1 from syncope on the day after the operation, and 1 from an unknown cause. He explains that the mortality in these cases was inconsiderable, as he had to deal with extensive lesions necessitating the sacrifice of a portion of the mandible. His pupil Latarget cites 10 cases, where the transhyoid route was preferred to mandibular resection. Lindenborn (1904), out of 23 cases operated on, had 9 immediate deaths and 14 rapid recurrences.

Buccal Route.—These isolated cases have not enabled the authors to arrive at precise statistics from this method of operating. Because the cases published have all been followed by operative recovery and survival for varying periods it must not be concluded that there may not have been unsuccessful ones. It is, however, fair to give prominence to the rarity of pulmonary complications and to the fact that the patient is spared the inconvenience and sometimes dangers which attend external pharyngectomy.

Indications and Contra-indications: Benign Tumours.—Internal pharyngotomy is applicable to all benign growths, solid or fluid, except the rare cases where they are excessively large or particularly vascular.

Malignant Tumours: (a) Sarcomata.—The fasciculated variety, according to Moure, would be most frequently met with; this form is generally encapsuled, accompanied with little or no infiltration or glandular involvement. It sometimes has a tendency to pedunculisation. It is, in the author's opinion, the type of malignant growth amenable to buccal intervention. On the contrary, the lympho-sarcomata, when diffuse with early glandular invasion and running a rapid course, should not be attacked by the oral route.

(b) *Epitheliomata.*—Here the desirability of operating by the mouth will depend on the duration and extent of the disease. In the early stage, when there is little or no glandular involvement and the laryngeal vestibule has been respected, a simple operation would be of service; in the advanced stage, with glands infected and the body of the mandible infiltrated, all operative treatment would be out of the question.

Situation of the Growths.—According to their site of origin, four groups may be distinguished:

(1) *Those of the velum*, the removal of which is usually easy and complete.

(2) *Those of the tonsil*, the most common, finally invading the adjoining parts, giving rise to dysphagia, salivation, aural pain, hæmorrhage,

etc. In practice two conditions are met with: either the glands are small and mobile, and then one can and ought to operate even when the growths are extensive; or there is a large glandular mass fused with the jaw—abstention is then the rule.

(3) *Lingual Tumours*.—Usually originating in the glosso-tonsillar sulcus, excision of which by the buccal route is generally very easy.

(4) *Growths of the Posterior Wall*.—These are for the most part the result of extension, and can be easily extirpated in consequence of the facility with which the posterior wall can be detached from the underlying structures.

Upon the whole, the authors feel that internal pharyngectomy will be indicated in almost all cases where the external operation can be practised, and one ought to consider less the nature and extent of the growth than the glandular infiltration accompanying it.

Operative Technique of Internal Pharyngectomy.—The preparation of the patient consists in bucco-pharyngeal disinfection, removal of tooth stumps, use of nasal ointment, alkaline gargles, and sometimes prophylactic injections of gelatinised serum, or chloride of calcium internally, for some days prior to operating.

Anæsthesia.—Except for small growths, where a 1 per cent. solution of cocaine can be employed, the author prefers chloroform.

Tracheotomy is not required save in cases of a growth towards the larynx, threatening suffocation at the commencement of anæsthesia, or if serious laryngeal or tracheal obstruction manifests itself during the operation. In such cases, laryngotomy will be practised with Botey's trocar cannula No. 5.

Ligature of Vessels: Extirpation of Glands.—Hæmorrhage observed by most operators, has been moderate and especially venous in character; preliminary ligature may be reserved for those cases where sternomastoid or retromaxillary adenopathy necessitates the opening of this region; a ligature can then be applied to the commencement of the external carotid when the glands are removed.

Excision of the Growth.—Encapsulated tumours can be enucleated with the finger after incision over their most prominent part. Hæmorrhage is usually arrested spontaneously after removal of the mass. In the case of a malignant tumour, connections and prolongations must be defined by critical palpation. This done, a vertical incision of the palate is made with a bistoury or thyrotomy scissors, an incision is then carried through the mucosa surrounding the growth, so as to embrace it in a circle with concavity infero-internal, extending from the median line to the base of the tongue and passing outside the anterior pillar. This is deepened under ocular control. The bulk of the growth is now rapidly removed, and hæmorrhage controlled by tamponment, and if necessary forei-pressure; the application of forceps is not always easy. Michel's clamps, recently modified by Wengener, may be employed with advantage. They can be left in the wound, and even if swallowed will not damage the patient. The operative field is then explored to follow up possible prolongations or suspected points of infiltration, attention being directed to the posterior pharyngeal wall, the tonsillar recess, and the region of the internal pterygoid muscle, where infiltration is much to be dreaded on account of the special proneness to diffusion and recurrence.

Sutures are employed to reduce the area of the wound, preferably catgut.

Post-operative Treatment.—Serum injections are often necessary.

Food is withheld on the first day, but is administered in liquid form on the day following. When the wound is extensive, alimentation is effected by a catheter passed through the nose. The oral cavity is irrigated with chlorated biborate of soda. Recovery is generally rapid. Rhinolalia aperta and reflux of food, which result from extensive excision of the palate, tend to diminish, owing to tissue retraction, and it is quite exceptional to have to resort to prosthesis.

Conclusions.—Daily experience demonstrates how tolerant the mucous cavities are to instrumentation in expert hands. Those who have familiarised themselves with thoracic endoscopy know to what extent buccal interventions have improved the prognosis of peri-bronchial or peri-oesophageal phlegmons induced by foreign bodies. Also, without repudiating the operative procedures which have secured so much success for general surgery, the authors feel it the duty of the laryngologist to restrict the character of the operative methods to the extent warranted by the progress of our special technique, without sacrificing the result aimed at to the simplification of the practice adopted. Meso-pharyngeal growths can for the most part be as effectually dealt with by the buccal route as by the external route.

H. Clayton Fox.

NOSE.

Horn, Henry (San Francisco).—The Ætiology and Treatment of Ozæna.
"Journal of American Association," August 28, 1915.

To verify the positive statements of Hofer, of Vienna, that the *Coccobacillus fetidus ozæna* of Perez was the true and only ætiologic factor in this disease, and his enthusiasm over the results of treatment by vaccines, Dr. Horn, of San Francisco, conducted a series of laboratory and clinical experiments with cultures furnished by Hofer. The laboratory experiments showed that the intra-venous injection of live cultures in very large doses will kill rabbits in from twelve to twenty-four hours, the only necropsy finding being the selective action of the organism on the turbinate bones of the nose. At first there is intense congestion, later on pus forms in and about the turbinated bodies, finally entirely blocking up the nares, and if the rabbit lives long enough, marked atrophy of the turbinates appears. The organism has been recovered from the nose of the injected rabbit in all cases, but so far Horn has been unable to obtain an agglutinating serum. The vaccines for treatment are made from seven or eight different strains, to which has been added one strain of the Perez bacillus which occurs normally on the mucous membrane of the nose of dogs. Autogenous vaccines would probably give the best results; but, as Hofer states, in clinical practice this is an impossibility. In many cases which clinically are undoubtedly ozæna one is unable to isolate the Perez bacillus, but an administration of the stock Perez vaccine will either cure or greatly improve the case. In administering the vaccines it is well to start with an initial dose of fifty million, doubling until the proper constitutional symptoms develop. The dose varies with every vaccine and every patient. The clinical manifestations are the best guide to dosage, and a period of at least one week should intervene between injections. The local reactions, as coryza, free discharge from the nose, sensations of heat and fullness over the bridge, are what one should endeavour to produce. Improvement is usually noted after the first dose. The odour diminishes, the crusts blow out more readily, and the feeling of tightness across the forehead improves.

From five to fifteen injections are considered necessary for a complete cure, and the patient must be carefully watched for a relapse, when the treatment should again be instituted. From his experiments and observations Dr. Horn draws the following conclusions:

(1) The *Coccobacillus fatidus ozæna* Perez, as isolated by Hofer, has answered all the bacteriologic requirements necessary to establish its identity as the ætiologic factor in ozæna.

(2) The isolation of this organism is attended with considerable difficulty.

(3) The production of agglutinating serum in rabbits is an exceedingly difficult task.

(4) The preparation of autogenous vaccines in every case is very difficult, if not impossible.

(5) At present mixed vaccines made from various strains of Perez bacillus is the most practical method of treatment now available.

(6) It may be necessary to precede or combine with the treatment the vaccines made from the organisms which are usually present in combination with the Perez bacillus.

(7) It may be possible that there may be two or more types of ozæna, bacteriologically different but clinically identical. *Birkett (Rogers).*

LARYNX AND TRACHEA.

Iglauer, S.—Accidental Pneumothorax during Tracheotomy, with Report of a Case. "Annals of Otology," xxiv, p. 303.

The accident referred to in this paper is rare. The author's case was a male child, aged twenty-three months. A diagnosis of foreign body in the air-passages was made, and, the child being cyanosed, a low tracheotomy was done without an anæsthetic. The child struggled continuously and pneumothorax of the right side resulted. Under careful treatment the child recovered, the lung having re-expanded by the twenty-seventh day. No foreign body was discovered, the real cause of the trouble probably being acute subglottic laryngitis. *Macleod Yearsley.*

REVIEW.

The Medical Annual Synoptical Index to Remedies and Diseases for the Ten Years 1905 to 1914. Vol. iii. Bristol: John Wright & Sons, Ltd. London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd. New York: Wm. Wood & Co. Toronto: The J. F. Hartz Co., Ltd. Calcutta: Thacker, Spink & Co., Butterworth & Co. (India), Ltd. Bombay: Thacker & Co. Melbourne, Sydney, Adelaide and Brisbane: G. Robertson & Co., Proprietary Ltd. Sydney: Angus & Robertson, Ltd. New Zealand: Whitcombe & Tombs, Ltd. 8s. 6d. net.

Those who have the good fortune to possess the volumes of the Medical Annual from 1905 to 1914 inclusive will find an enormous amount of usefulness in the Synoptical Index to these volumes published by Messrs. Wright & Sons; they can at once refer to their bookshelves and get recent and exhaustive information in the minimum of time.

Those who are not so fortunate should also possess themselves of the index, because, in the first instance, they can see where to find the wanted information at their medical library, but, furthermore, they will have in the index not merely a guide to the volumes and pages, but on many subjects valuable and practical information, chiefly in the form of therapeutic hints, extracted from the articles referred to. The work is, therefore, not a mere conglomeration of the alphabetical indexes, but a catalogue *raisonné* and something more.

Dundas Grant.

NOTES AND QUERIES.

Cancer of the Thyroid Gland. Gaylard, Harvey, R., and Marsh, Millard C. *Carcinoma of the Thyroid in the Salmonoid Fishes.* (Publications from the State Institute for the Study of Malignant Disease, Washington. 1914.)—As a result of investigations and experiments the following conclusions were arrived at:

(1) The disease known as gill disease, thyroid tumour, endemic goitre, or carcinoma of the thyroid in the Salmonidæ, is a malignant neoplasm.

(2) The disease occurs in fish living under conditions of freedom in populated areas.

(3) When introduced into fish-breeding establishments it becomes endemic with occasional epidemic outbreaks.

(4) Normal fish taken from the wilderness may be made to acquire the disease when placed in fish-breeding establishments where the disease is endemic.

(5) The feeding of uncooked animal proteid favours and the feeding of cooked animal proteid retards the disease as compared with the uncooked. Feeding alone is not an efficient cause. It must be combined with an agent transmitted probably through the water or the food, or both.

(6) By scraping the inner surface of water-soaked wooden troughs in which the disease is endemic, an agent may be secured which, from its action upon the mammalian thyroid when administered through drinking water is no doubt the cause of the disease in the fish confined in these troughs.

(7) The agent is destroyed by boiling.

(8) Fish in all stages of the disease are favourably affected in the direction of cure by the addition to the water-supply in suitable concentration of mercury, arsenic, or iodine.

(9) The effect of mercury, arsenic, and iodine in carcinoma of the thyroid in fish, and the subsequent positive experiments with metals in mammalian cancer, are probably the expression of a therapeutic relation of these metals to carcinoma.

(10) Certain species of the Salmonidæ have an almost complete natural resistance to the disease.

(11) Certain lots of fish of susceptible species show a high degree of immunity to the disease.

(12) Spontaneous recovery occurs in a considerable percentage of individuals.

(13) Removal from ponds in which the disease is endemic to natural conditions, or a change to more natural food, increases the percentage of spontaneous recoveries.

(14) Spontaneous recovery appears to confer a degree of immunity against recurrence.

(15) The percentage of spontaneous recoveries in the early stages of the disease appears to be higher than in the later stages of the disease.

(16) The incidence of the disease increases with the age of the fish, at least up to five years.

(17) Thyroid enlargement and changes presenting at the end of five months a picture of diffuse parenchymatous goitre were induced in mammals by giving them water to drink in which the disease is endemic. Control animals which received the same water boiled failed to develop thyroid changes. That these enlargements and changes are the first stages in mammals of the same disease which occurs in the fish inhabiting the troughs from which the scrapings were obtained, is an inference which further experiments will probably justify.

(18) The disease is endemic in a very high percentage of all trout hatcheries in the United States.

(19) The occurrence of the disease in wild fish, its introduction into fish cultural stations, its localisation in certain troughs or water supplies, the method of its spread, its transmission to mammals, the efficacy of three well-known germicides in the treatment of the disease, the destruction of the agent by boiling, the phenomena of spontaneous recovery and immunity, strongly indicate that the agent causing the disease is a living organism.

(20) No evidence has yet been produced to indicate the direct transmission of the disease from individual to individual.

(21) In many of its phases the disease is identical with endemic goitre. As there is no line of demarcation between what is called endemic goitre and what the present workers show to be cancer of the thyroid, they hold that endemic goitre and carcinoma of the thyroid in the Salmonidæ are the same disease.

It has long seemed probable to the abstractor that the secret of the pathogenesis of cancer may ultimately be disclosed in the tumours and enlargements of the thyroid. And the foregoing investigations would seem to strengthen this belief. But it must not be forgotten that the passage of parenchymatous goitre into a cancerous growth of the thyroid indicates no more than the transformation of an innocent neoplasm into a malignant neoplasm probably as a result of an excessive effect, relative to the tissues, of the same irritant which had induced the former. In other words, the character of malignancy is assumed by the new growth for reasons which are still unknown to us. That is to say, that while the above findings extend our knowledge of the natural history of neoplasms, they do not, unfortunately, render it any deeper in the direction of most importance and urgency.

D. M.

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THE NOTIFICATION OF MEASLES.

THE order of the Local Government Board making measles a notifiable disease should meet with the sincere approval of the whole profession, including that section practising otology. Otologists see daily the ravages of this disease when it attacks the ear, and those who are interested in the prevention of deafness and diseases of the ear will feel that the notification of measles must mark a distinct step in the progress of aural prophylaxis.

It may be of interest to our readers briefly to point out what measles means to the child population. Out of every 100 deaths at ages under five in England and Wales in the three years 1911-13, 12.5 per cent. were caused by measles and whooping cough, and 31.6 per cent. by these diseases and bronchitis and pneumonia, of which measles and whooping cough are common causes. In the three years 1911-13 437,101 deaths occurred in England and Wales at ages under five years. Of this number 33,457 were caused by measles, 21,028 by whooping cough, and 83,650 by bronchitis and pneumonia.

Out of every 100 cases of measles admitted to the hospitals of the Metropolitan Asylums Board (the most serious cases) from 22 to 25 per cent. proved fatal. During the thirteen weeks ending June 5, 1915, 5807 deaths of children under five occurred in London, being 2190 in excess of the number in the corresponding period of 1914. Of this number 1023 were directly due to

measles, *not including the large number due to its common sequelæ*. Taking an average of the ten years 1905-14, in London, measles has caused 1862 deaths, as compared with 1454 deaths due to all the notifiable infectious diseases put together (smallpox, scarlet fever, diphtheria, typhoid, puerperal fever, etc.).

These figures show forcibly the appalling ravages which measles makes every year upon our infantile population, but it does not convey any idea of its fell nature as regards the physical fitness of those children who survive. Sir James Crichton-Browne, speaking recently at the Royal Society of Medicine, remarked that notification would open the eyes of the public to the gravity of measles as a disease. There had hitherto, he said, been a tendency to look at it with levity, and treat it with a complacent acquiescence as being like teething, one of the essential concomitants of infancy. Measles is in reality a very deadly disease, which sets up various other diseases, notably bronchitis and pneumonia. A large proportion, as we have just seen, of the deaths by these diseases in infancy and childhood are really due to measles, which is not unfrequently the initial cause of tuberculosis.

Some idea of the part played by measles in the incidence of ear disease may be gathered from the statistics published by an otologist who has exceptional opportunities for judging of the causes which are at work in rendering children too deaf to be educated in hearing schools. According to this observer, out of 592 children suffering from acquired deafness of sufficient severity to necessitate special education, 89, or 15 per cent., owed their deafness to measles. "This does not, however, indicate anything like the real number, because, for one thing, it does not include cases in which the deafness was due to meningitis, caused by measles; and also because measles causes deafness not only by suppuration and meningitis, but, later, by inducing adenoids."

Enough is not said in the text-books to bring home with sufficient emphasis to the student the real part played by measles and the other exanthemata in ear disease. Indeed, very few standard works pay sufficient attention to the relation of their subject to general medicine. They are so occupied in long descriptions of operations and other measures for dealing with results that first causes are apt to be neglected. The more one reviews the otology of the past two or three decades, the more it is forced upon one that otologists occupy themselves so much with established disease that they have not time to pay any attention to the prevention of the causes which lead thereto. No doubt long dis-

cussions upon refinements of treatment—upon when and where this vein ought to be tied or that piece of bone removed; upon what shape a mastoid flap should be and how to deal with a suppurating labyrinth—are exceedingly valuable and have been the means of saving some hundreds of lives. But they are apt to blind the debaters to the importance of other and more weighty matters, and we venture to think that were some of the time spent in going to the roots of the tree of disease instead of pruning its leaves there might be saved even more lives, and thousands of cases of discharge and deafness prevented. Surely it is better to consider the exact process leading to middle-ear suppuration in measles, scarlet fever, and diphtheria, and the best method of promptly circumventing them, than to watch their march and discuss measures for dealing with them when they have arrived.

Happily there have been, during the past ten years, signs of a gradual awakening of otologists to the prevention of deafness and ear disease. For instance, they have made representations to the powers that be of the necessity for aural surgeons to be attached to fever hospitals. It is true that the powers that be consist chiefly of lawyers, who deal rather in words than in deeds, and that the suggestion coming from a more practical profession has been looked upon with a suspicious eye and carefully shelved. But the resolution made at the Liverpool meeting of the British Medical Association marked the moment when otology began to awaken to the possibilities of prevention. Unfortunately, otology cannot claim the merit of being instrumental in placing measles on the statute book as a notifiable disease, although there are one or two specialists who have long clamoured for a proper recognition of measles by the authorities. We take the opportunity of this new era in notification to point out to otologists that there is a great future before them in the careful study and elaboration of methods of prevention in aural diseases.

M. Y.

ATROPHIC RHINITIS (OZÆNA) AND TUBERCULOSIS.

III.—THE PATHOLOGICAL ASPECT.

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Historical.

IN 1893 the writer presented the results of his clinical and pathological investigation of sixty cases of atrophic rhinitis which, although inconclusive, indicated an affinity of the disease with tuberculosis. Since that date systematic examination of many hundreds of cases has been carried on, and although attention has been directed chiefly to the local phenomena, the blood, urine, etc., have also been searched for evidence.

Many observers have sought for a specific organism, with but doubtful and discouraging results. Considerable attention, however, has been paid to the Perez bacillus. This micro-organism has been specially watched by us, with the result that no justification could be found for its specificity. During the research attention was paid to acid-fast organisms, but as none possessing the alcohol-fast property of the tubercle bacillus could then be discovered, but little importance was attached to those which were simply acid-fast. Later it became evident, however, that these organisms could not be ignored, for many reasons. They were present in every case of true atrophic rhinitis, but in no other disease of the nose, and in some of them they proved to be not only morphologically identical with the tubercle bacillus, but occasionally were even moderately alcohol-fast and colour true to the Ziehl-Neelsen stain. Although this was only an occasional feature it called for closer investigation, which shall now be discussed.

In 1887 Spencer Watson¹ advanced the view that there was a close analogy between atrophic rhinitis and *lupus non-exedens*, and that they might both be due to a common bacillus. Such a view was supported by the present writer's clinical experience at the time, for not only had 60 per cent. of his cases a definite history of phthisis, but he was also impressed by the great similarity in the histological changes to tuberculosis in its early or inflammatory stage. At the present moment considerable support is given to this association and it is to this that attention will specially be

¹ Spencer Watson, "Diseases of the Nose," p. 85.

directed. It is hardly necessary, however, to emphasise the wide gaps which separate the two diseases, both clinical and pathological. One feature specially is emphatic: atrophic rhinitis is always confined to the area covered by mucous membrane, while lupus has no such restriction, the skin being involved quite as often as the mucous membrane. In the early stages of the disease the turbinal tissue shows a striking resemblance to tuberculous deposit. There is great activity of endothelium, which gradually obliterates lymph and blood vessels attended by surrounding lymphocyte and plasma-cell infiltration, but no giant cells and no tubercle bacilli. Later on the endothelium becomes fibroblastic, lymphocytes disappear and sclerotic changes follow. So that necrosis, caseation, and true ulceration never occur as in tubercle and syphilis. It more closely resembles healing lupus. The clinical aspect of atrophic rhinitis has already been dealt with in the first article by Dan McKenzie, but the investigation of its pathology has amply proved that a concise definition of the *constants* of the disease is called for in order that there shall be no misunderstanding as to the real nature of the materials examined. For although the terms *ozæna* and atrophic rhinitis are loosely applied, and much confusion has prevailed, this investigation has so far fully established that atrophic rhinitis or *ozæna* is undoubtedly a disease *sui generis*, and that it has certain features which distinguish it from all other foetid nasal disorders. But it must be clearly stated that, although named rhinitis, the disease is not limited to the nose, for it tends to spread far beyond the nasal cavities and may sometimes even appear to begin in the mucous membrane of the larynx and pharynx. But it is confined to the mucous membrane: it never invades the skin by continuity.

The chief and essential clinical constants are, briefly:

- (1) Fætor of a special character.
- (2) More or less enlargement of the nasal chambers (*i.e.* greater patency).
- (3) Presence of dark, dry "crusts."
- (4) Anosmia more or less with diminished common sensibility of the nose and pharynx.
- (5) Disappearance of *all* lymphoid structure (tonsils) (at least after puberty).

In the "International Collective Investigation Guide," published in 1912, much prominence is given to the symptom "suppuration," in fact it is included in the "constants." This I venture to unhesitatingly exclude, because in fully developed cases

where a pseudo-granulomatous condition exists there is no true discharge of pus. The crusts are not pus in its correct sense. There is no ulcerating area; the disease is passive atrophy. Even in the earlier stages there is no flow of pus, the secretion resembling a thick catarrhal exudate coming from an area which although crowded with lymphocytes is still intact, still covered with epithelium. It must be emphasised that at no period of the disease does true ulceration exist (unless traumatic), therefore the term suppuration is inappropriate and misleading as a constant diagnostic feature.

Individually these features are only presumptive, collectively they are almost convincing, but they are incomplete for a positive diagnosis without an examination of the crusts. Should this afford evidence of the acid-fast bacilli the case may be accepted as undoubtedly ozænatous *rhinitis atrophica vera*.

Histology.

Judging from the macroscopic appearance seen in a well-marked example of ozænatous atrophic rhinitis, profound alteration in the structure of the mucons membrane would be expected. As a matter of fact the changes are by no means extensive. In early stages there may be no more than a uniform shrinkage of the soft structures; later, however, the following alterations will be found which are not uniformly distributed, but accentuated in certain but variable regions.

An abundant supply of material has enabled one to make a careful study of the changes in the soft tissues in all stages of the disease. This was at first chiefly directed to nerve structures and evidence of bacterial infection. In addition to atrophy of the olfactory cell terminals, marked distortion, compression, and in places complete disappearance of the nerve-fibres could be demonstrated. These changes involved the fifth nerve as well as the special and were evidently secondary to the mesothelial infiltration of the perineuronal sheaths. They were originally viewed as evidence in support of the troph-neurotic theory regarding the pathogeny of the disease. They must now be viewed as a consequence and not as a cause.

In early stages of the disease the turbinal tissue is certainly swollen. This is evidently due to the large amount of cellular infiltration which consists of lymphocytes, endothelial and plasma cells, in fact a pseudo-granulomatous condition, but without giant

cells, and no surface ulceration. Later on, the lymphoid elements become fewer and atrophy of all elements follows. These changes conclusively show that there is a very slow and mild inflammatory process during the early stage which precedes atrophy of the chief elements, nerves, glands, and subsequently blood and lymph vessels. No bacteria could be found in the deep structures. There is no evidence of necrosis; it is simply atrophy with the appearance of sclerotic tissue apparently derived from the endothelial elements which become fibroblastic. These pseudo-granulomatous elements when seen in early stages are scarcely distinguishable from lupus except for the absence of ulceration and of giant cells. As tubercle bacilli are so rarely found in lupus their absence possesses but little diagnostic significance. The lesion clinically certainly does not follow the course of lupus; this atrophic process never invades the skin and bone, and never undergoes active ulceration. And yet, like lupus, it tends to undergo sclerosis and spreads, but the extension is *strictly confined to contiguous mucous membranes*, involving the adjacent accessory sinuses, the nasopharynx, oropharynx, eventually attacking the larynx and trachea, where the crusts are easily seen, and present the same histological and macroscopic characters as that collected from the nose. The metaplastic changes in the epithelium are very striking. Columnar epithelium and olfactory ciliated cells, together with the hyaline basement membrane completely disappear and are replaced by a dense layer of closely packed spheroidal and squamous epithelium resembling the epiderm. This may be invaginated and form "pearls" or cholesteatomatous "nests," similar to those found in the middle ear and tonsils, and mixed with many varieties of bacteria, including the acid-fast bacillus. Beyond some slight endosteal thickening and osteoporotic distension of adjacent spaces the bone shows no sign of disease.

Gland disappearance.—All glands disappear in a degree proportionate to the duration of the disease. In fully established cases no glands could be found in sections of turbinal bodies and septal tissue beyond relics of ducts blocked with laminated squames and amorphous *débris*, while earlier material showed interacinous infiltration by lymphocytes and plasma cells, which caused distortion and eventual disappearance of the secretory elements.

This is one of the most striking and constant phenomena, involving not only the secretory glands, mucous and albuminous, but also the lymphoid structures. Faucial, pharyngeal and lingual

tonsils completely disappear, and even the lymphoid pulp of the middle and upper turbinals, the septum and the ventricular bands.

Although these features microscopically in a measure resemble lupus, there is never any exuberant growth of granulomatous tissue or ulceration as one sees in a tuberculoma. As in lupus, the endothelial elements play a preponderant part, but they do not form "giant-cell systems," they tend to become fibroplastic and never caseate. Plasma cells are ever present as in all other forms of chronic inflammation, those of recent formation exhibiting the red or pyroninophile granules, while older ones show the large brown or copper-coloured spheres.

Somewhat similar changes are seen in rhinoscleroma but much more marked, hyaloid bodies being a constant and predominant feature.

There are evidently two distinct stages or phases—an early one, in which the structures may be swollen, when there is more or less numerical increase in the fixed and wandering connective tissue cells, and a later or atrophic stage which is not only attended by shrinkage of tissue but also by a diminution in number of the new mesothelial elements, with metaplastic changes in the glands.

Secretion must obviously be profoundly influenced by these changes. At first there is plenty of mucin mixed with an ordinary catarrhal exudate; this gradually diminishes in quantity and quality, mucin and leucocytes gradually falling in proportion.

Too much importance must not be attached to the absence of giant cells and bacilli, which is not necessarily contra-indicative of tubercle. All tubercular changes are characterised by an essential mesothelial activity with a surrounding zone of lymphocytes which seems to be more in evidence when giant cells are formed. In atrophic rhinitis this does not occur; the mesothelial activity is not focussed as systems but diffused.

It seems, therefore, that the histological changes have the closest resemblance to lupus erythematosus, which is an attenuated tuberculoma without giant cells and bacilli.

The normal lymphoid tissue of the turbinal and septum in the early stage may be increased, but later it disappears with the other elements as fibroblasts increase.

That the bone escapes any granulomatous infiltration or inflammatory invasion is a most significant feature, and cannot be too strongly emphasised in view of the statement so often made that the disease is suppurative. Suppurating ethmoid disease may be attended by crusts-formation and by fœtor, but those features do

not constitute ozænatous atrophic rhinitis. In lupus the bone is generally involved.

Blood Examination.

In some well-established cases a distinct fall in hæmoglobin percentage was observed with a low-colour index, indicating secondary anæmia. The leucocyte count was generally normal, but in all cases there was invariably a high proportion of oxyphiles, varying from 3 to 5 per cent. The lymphocytes showed a relative and an actual increase, both in the large (myelolymphocytes) and in the small ones. Opsonic and phagocyte tests with tubercle bacilli invariably afforded high indices.

Examination of the Crusts.

It is from this source that the most valuable information has so far been obtained.

In early stages of the disease the discharge may be fairly free and of an exudative or catarrhal type, creamy in consistence and appearance. It contains plenty of leucocytes with a few plasma cells, lymphocytes, and "tailed" epithelial cells with bacteria of all kinds, including an occasional acid-fast bacillus. When the atrophic features are fully established it changes in character, being gradually reduced in quantity and darker in colour, until eventually the characteristic green fœtid crusts are fully established. Even early they may be grey or even black; this is, however, due to anthracosis or dust particles, and will vary with the patient's surroundings, but the green colour deepens in intensity with the duration of its retention in the nose. The longer it remains *in situ* the darker is the olive green, which is probably due to various chromogenic cocci of the staphyloid group. The fœtor seems to be specially associated with the small *Cocco-bacillus fœtidus*, but may also be due to varieties of proteus. These changes in colour and fœtor can be easily watched *in vitro*.

Chemically the crusts afford much fatty material and keratinoid granules with cell globulins and only a trace of mucin. Lipoids are therefore a prominent feature. If small pieces of the crusts are spread on slides, firmly rubbed and pressed together, then separated by sliding, thin films are easily made. Should the crusts be very hard a drop of normal saline solution may be added. Leucocytes, lymphocytes, and squamous epithelial cells will be found in all

stages of degeneration, with an occasional plasma cell, mixed with a great variety of bacteria-cocci and bacilli. Gram-negative staining readily differentiates the staphyloid and streptococcal forms from *Diplococcus catarrhalis*. A Gram-positive beaded bacillus of the diphtheroid type (*B. xerosis*) is very common, but the constant and characteristic organism must be sought for by fuchsin staining. This is the "acid-fast," which always is more plentiful in the hard and darker parts of the crust. It should be treated as follows:

Fix the film by radiant heat; stain on hot slab by 5 per cent. carbol fuchsin for ten minutes, adding fresh solution as may be necessary in order to avoid drying. Flood two or three times with 25 per cent. H_2SO_4 until all the red colour is removed. Rinse with tap-water and counterstain with 1 per cent. methyl green. The "acid-fasts" will appear a brilliant coral red, all other organisms pale-blue (optically). To exclude tubercle other films must be heat stained by carbol fuchsin, then passed through acid bath and washed freely in alcohol before counterstaining, preferably in saturated alcoholic solution of picric acid. This proves them to be alcohol- as well as acid-fast; most of these special bacilli in question are only acid-fast. Some of them, however, are distinctly alcohol-fast.

The Ziehl-Neelsen stain is only roughly diagnostic, and not so precise as the picro-fuchsin, which emphatically excludes all bacilli which are only acid-fast. It is interesting to note that with the methyl-blue counterstain many of the bacilli are amphophile, they pick up blue as well as red in varying degrees of intensity, so that they are not "colour true."

These acid-resisting bacilli are so constant a feature of all the crusts that they call for special description and attention. They vary somewhat in form, size, and staining, but are always strongly suggestive of tubercle. They may be long or short, thick or thin, single or fasciculated, each one blunt or tapering, beaded, or uniformly staining, straight or bent. The long, slender forms resemble streptothrix. But all these variations are not found in one case. The differences are those which occur in a large variety of cases at different stages of the disease. Experience has taught that they are constant in their occurrence, and although not universally superior in number to other bacterial forms, they are always sufficiently numerous to be a prominent feature in every film properly stained. Further, they are persistent, being present during the whole duration of the complaint. The important question is, Are they pathogenic as well as pathognomonic?

Other Acid-fast Bacilli.

In other regions of the body, and in other morbid states, acid-fast bacilli are also found. In chronic discharging disease of the middle ear they are very common, and may be found in old brain abscesses secondary to ear lesions, in chronic eczema of the navel, in faeces, from all the superficial areas of the genital tract in both sexes, even in the urine, and in the foul material from the toes.

In all these conditions, however, they are associated with some form of fatty degeneration, and their peculiar acid-fast quality is doubtless acquired. They are always bacilli, for acid-fast cocci are never seen. They are Gram negative in reaction, and are probably strains of proteus or subtilis. One feature is that they will not retain their acid-fast character when grown in ordinary media, but on the addition of lard, oleic acid or other fatty substances to the medium, they will show acid-fast staining. They are therefore not naturally acid-fast like tubercle, but acquire that property from their surroundings in the medium in which they grow. They are not the acid-fasts of ozæna.

It is very significant that the "acid-fasts" of ozæna are far more plentiful in old, dark-coloured, dry, fatty crusts than in the more recently exuded, soft, "creamy" discharge. The question therefore naturally arises, Is it the same organism as found in the ear and elsewhere? Although it is undoubtedly polymorphic, and often varies in shape in direct films taken from different cases, yet when grown it always exhibits constant morphological characters, resembling a streptothrix, and retains its acid-fast property.

It must be clearly understood that, although it is customary to assume that those bacilli which lose their fuchsine after the alcohol bath are not tubercle bacilli experience in research has fully established that this is only a partial truth, and that many varieties of the genuine tubercle bacillus do not resist the alcohol bath. Such a distinction may be, and is, a very useful routine guide in the daily search for tubercle bacilli in sputum, but it certainly must not be applied to the refinements of research without qualification.

Many acid-fasts which were found in aural discharges and at the time discarded as being merely fortuitous acid-fasts, are now regarded as genuine tubercle bacilli notwithstanding their being unconformable to orthodox tinctorial requirements.

It must not, therefore, be too readily assumed that an acid-fast

bacillus morphologically resembling tubercle is *not* tubercle simply because it becomes colourless on washing with alcohol.

Cultivation.

Early attempts to grow these "acid-fasts" were disappointingly unsuccessful, but it was soon found that they could be "reinforced" by adding a small quantity of peptone broth to the crusts and incubating for five days. As they refused to grow aerobically or anaerobically on or in any orthodox medium, their natural habits were imitated in the following manner: Crusts were mixed with broth and incubated for several days, then filtered and sterilised by heat. This fœtid broth medium was inoculated with crusts, and in it the acid-fasts grew in from ten to fifteen days. A better plan still is to mix agar or Dorset egg medium with the fœtid broth and grow as smears, taking care to avoid drying, as the process is a long one. They grew as long slender bacilli in felted clumps resembling streptothrix. The growth period seemed to be shortened by adding 1 c.c. of blood to the fœtid broth.

All attempts to grow them anaerobically failed completely. In every successful culture the growth was scanty.

Life History.

These acid-fasts seem to increase in number as the disease progresses. At first they are very few; later they are abundant, but always most numerous in the crusts. Careful search has failed to demonstrate them in the tissues of the nose. Yet they are easily seen in the viscera of the inoculated guinea-pig. They are evidently slow to grow and are easily scavenged by a free exudation; further, they evidently demand special conditions for their growth which the tissues themselves do not afford, much the same as do the spirochætes and fusiforms of noma.

Are they air-borne? If they are, they should also be found in rhinitis sicca and other conditions associated with crusts, but they are never found in such circumstances.

Whatever their source may be there exist in the nose and its accessory chambers certain conditions peculiarly favourable to their growth, viz. protection, moderate moisture, moderate temperature, constant supply of nutrition and air, together with lipoids and a fœtid substance. This last is an important factor and recalls the behaviour of spirochætes of Vincent's disease and of syphilis, both growing freely in fœtid surroundings.

They are, therefore, probably symbiotic and depend upon their factor producing neighbours the *Cocco-bacillus fœtidus* and *proteus vulgaris*.

They are epicurean in their requirements, for they will not grow in or upon the orthodox media. Further, when passed through an animal by inoculation they lose much of their polymorphic character and assume the more definite streptothricial form, to which genus they doubtless belong, and they become still more like tubercle bacilli.

Inoculation Tests.

Through the courtesy of the Lister Institute a course of systematic tests with guinea-pigs was undertaken. Although this is far from being finished, the results of the first group, which was dealt with by Dr. Henderson Smith, may be given, without prejudice to the completed search. The quest is necessarily protracted, but the significance and striking nature of the evidence already afforded calls for their present record.

In September, 1915, six guinea-pigs were inoculated by Dr. H. Smith with a reinforced emulsion made from a well-marked case of ozæna (three intraperitoneal and three subcutaneously).

Results.—No. 1 died on October 25 (sixth week), showing well-marked tuberculosis of spleen.

On November 23 (tenth week), the remaining five, appearing healthy, were killed and examined.

No. 2 revealed extensive caseation of liver, spleen, retroperitoneal and inguinal glands.

No. 3 showed well-marked caseation of inguinal glands but viscera were apparently unaffected.

Nos. 4, 5, 6 appeared to be quite free from any disease.

Nos. 1, 2 and 3 were injected subcutaneously, 4, 5 and 6 intraperitoneally.

Histological examination showed that the foci of caseation were characteristically tubercular. There were typical giant-cell systems with tubercle bacilli in and around the giant cells. The bacilli were all alcohol- as well as acid-fast, and of the slender type.

Dr. Henderson Smith reported as follows:—

“The smears from the spleen nodules and the glands both showed acid-fast bacilli very like tubercle. I have very little doubt they are tubercle. I was interested to find that you obtained histological tubercle in the sections.”

Emulsions were made from the tubercular viscera of Nos. 2 and 3 with which three guinea-pigs were inoculated on the same day (November 23, 1915), Nos. 1 and 2 subcutaneously, No. 3 intraperitoneally.

No. 1 died during the eighth week, No. 2 during February, 1916 (twelfth week), both showing extensive gland caseation which Dr. Schütze reported as containing "bacilli both acid- and alcohol-fast, obviously tubercular." Guinea-pig No. 3 was lost sight of.

It is worth noting that those injected intraperitoneally all escaped infection; it was the subcutaneously injected which developed lesions. Further, there was no pulmonary deposit in any of them.

Thus, excluding one animal which was lost sight of, *five out of eight developed lesions which were undoubtedly tubercular.*

In each test the most rigid precautions against contamination were taken at every stage of the process, from collection of the crusts at hospital, to inoculation of the animal.

No intranasal lesions could be found.

Conclusions.

It is not claimed that this investigation has reached a stage at which an unequivocal positive affirmation can be made. It may not be conclusive, but it is presumptive. It has shown—

(i) That a certain acid-fast bacillus is present in every case of true ozæna (atrophic rhinitis) which is never found in any allied conditions.¹

(ii) That it possesses a close morphological and tinctorial resemblance to the tubercle bacillus.

(iii) That the histological changes resemble those of a tuberculous condition (lupus erythematosus).

(iv) That animal inoculation produced lesions undistinguishable from tuberculosis.

But there are two postulates which have not been conformed with, viz.:

(a) Demonstration of the organism in the diseased tissues.

(b) Production of the disease in an inoculated animal.

With regard to the first, it may be urged that it is not alone in this deficiency, since other diseases share the same defect. As to the second, it is almost an insuperable difficulty in a guinea-pig,

¹ Its presence is not transitory nor does it appear to be profoundly influenced by general and local treatment, for cases which have been under observation for several years, notwithstanding marked improvement, still show plenty of "acid-fasts" in smears taken from the scanty nasal exudate.

not only for anatomical reasons, but also physiological. The disease in man is spread over a long period of years, and one can hardly expect a condition of such slow growth to be developed in the very short period of observation on the short life of the animal. So that some critical elasticity is demanded in this direction.

It must be borne in mind that the bacillus of tubercle is polymorphic, and not always alcohol-fast. That it is often apparently absent in conditions which other evidence has proved to be tubercular. Further, that as the visible phenomena of ozæna are strictly local and superficial, it is not surprising that these particular acid-fasts are restricted in their distribution. That the whole body indirectly shares the trouble is amply proved by tuberculin reaction.

Notwithstanding these weak links, this pathological investigation supports the view that atrophic rhinitis is a disease closely allied to tubercle, and *that its subjects are purveyors and distributors of an organism which is probably a variety of the tubercle bacillus.*

Perez cocco-bacillus.

Considerable attention was also paid to this organism, but for many reasons its importance, still less its claim to specificity, was found to have no foundation. In the first place, it occurs in nearly every case of ordinary nasal catarrh; also in swabs from tonsils and teeth (pyorrhœa), and in many other conditions remote from atrophic changes. But, most significantly, it was far from constant in ozæna crusts from different cases, and in the same case at different times of examination.

The acid-fasts were the only organisms which were constant and persistent. Whatever rôle, therefore, Perez bacillus may play, it is only supplemental, and not causal. It is only an occasional, and not a constant attendant.

FINAL REPORT ON THE ISOLATION AND CULTIVATION OF THE TUBERCLE BACILLUS FROM THE DISCHARGING EAR IN CASES OF CHRONIC PURULENT OTITIS MEDIA.¹

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AURAL tuberculosis has long occupied a prominent place in otological literature. The older writers, notably Wilde (1) (1853), Schwartze (2) (1878), Toynbee, and others, recognised tuberculosis of the temporal bone as a definite clinical entity. With the discovery of the tubercle bacillus by Koch in 1882, it became possible for the first time to differentiate tuberculous otitis from the simple inflammatory or pyogenic form.

Tuberculosis may affect the ear primarily or secondarily. Cases of primary tuberculosis have been reported by Herman Knapp (3), Goldstein (4), McEwen, Milligan (5), Zaufal (6), McCaw (7), and others.

Secondary aural tuberculosis may complicate pulmonary tubercle, or may result from tuberculosis of the glands, intestines, bones, etc. A frequent cause is a tuberculous adenoid. Nasal tuberculosis is a rare ætiological factor.

The acute form of tubercular otitis is characterised clinically by its rapid onset; the occurrence of multiple small perforations which quickly coalesce, forming a large defect; the rapid formation of granulations; early periotic glandular involvement; and the early appearance of facial paralysis.

The chronic type of tuberculosis of the ear is distinguished by its painless onset, protracted course, and resistance to treatment. Extensive destruction of bone, often leading to facial paralysis, is extremely characteristic of this disease. Rarely, tubercles appearing as yellowish spots may be seen through the semi-transparent tympanic membrane.

Macleod Yearsley (8) states that the tuberculous perforation is usually circular, with pale, thick, and indolent edge, showing no reparative activity, and generally situated in the posterior superior quadrant. He says "that the establishment of a painless perfora-

¹ Paper read at the Annual Meeting of the American Laryngological, Rhinological, and Otological Society at White Sulphur Springs, West Virginia, May 5, 1916.

tion in this situation is considered by Buck and Blake as pathognomonic of tubercle."

The series of cases of tuberculous otitis observed by us and reported below do not show tympanic perforations in this locality.

The early methods employed to identify aural tuberculosis are as follows :

(1) Staining the aural discharge, excised granulations, or tissue for tubercle bacilli.

(2) Excision and microscopic examination of dead bone, granulations, or tissue taken from the tympanic cavity or mastoid.

(3) Excision of periotic lymph glands.

(4) The von Pirquet reaction, if positive in children under two years of age, is highly suggestive of aural tuberculosis, especially if no other active tubercular lesion is found.

(5) Tuberculin injections have also been a valuable diagnostic aid.

(6) Animal inoculation, although subject to many difficulties and delays, has been the most certain method in the past.

(7) The complement fixation test, recently devised by Dr. R. H. Miller in Prof. Zinsser's laboratory at Columbia University, New York, gives promise of becoming an important method of diagnosis.

(8) The cytologic examination of the pus from the discharging ear, together with the proteolytic action of the pus, has been shown by Brieger to be absolutely valueless as a means of differentiating tubercular from pyogenic suppurations. This observation was recently confirmed by one of us (Dwyer).

In a preliminary communication (9) we reported in January, 1915, a new method for isolating and cultivating the tubercle bacillus from discharging ears and mastoid wounds. This method was based upon the use of antiformin, which destroys all the common pyogenic organisms except the acid-fast group. The ordinary procedure used in the examination of sputum was modified somewhat because of the difference in character of the aural discharge and sputum. The method was as follows :

The discharge was obtained in as large a bulk as possible in a small quantity of normal salt solution, the latter being used in an amount just sufficient to wash out the pus. The water used in making up the salt solution was freshly distilled each day in order to be sure that none of the acid-fast organisms present in tap water or in old distilled water could vitiate our results. This discharge was then treated with an equal amount of 15 per cent. antiformin, and the whole was allowed to stand for a varying period, depend-

ing upon the consistency of the mixture, etc. It was then centrifuged, and the precipitate was washed in order to remove the excess of alkali. Smears were then made from the precipitate and stained by the Ziehl-Neelsen and Pappenheimer method. In this way we were able to demonstrate the organism with reasonable certainty. By this method, no matter how much care is exercised, there is always an element of uncertainty in morphological diagnosis alone, as in many of the old chronic suppurating ears the acid-fast epithelioid flakes are apt to be mistaken for tubercle bacilli. These flakes are present in a large proportion of chronic cases.

In the series reported in our preliminary paper an effort was made to isolate the organisms from the discharge and cultivate them directly upon special media so that there could be no question as to the diagnosis. Thus, animal inoculation was eliminated and much time was saved. This was made possible by the use of Petroff's media, a full account of which appears in the *Journal of Experimental Medicine*, January, 1915. During the summer of 1914, Petroff, working in the bacteriological laboratory of the College of Physicians and Surgeons, Columbia University, devised a specific medium, which we have used successfully for cultivating the tubercle bacillus.

The method we employed in the preliminary work is somewhat different from Petroff's. It is really a combination of Petroff's method of isolating from sputum and his method for faeces. This modification was rendered necessary by the large number of spore-forming organisms often present in chronic otitis. Our technique is as follows :

After obtaining the aural discharge in a wide-mouth bottle, it was immediately saturated with sodium chloride and allowed to stand for from half an hour to an hour. At the end of this time the bacteria are found floating on the surface. This floating film is then collected with a deflagration spoon in a wide-mouth bottle, and an equal volume of normal sodium hydroxide added. The mixture is shaken well and left for digestion in the incubator at 37° C. for one to two hours or longer, care being taken to shake it every half hour. The mixture is then neutralised through sterile litmus paper with normal hydrochloric acid, and the sediment is inoculated into several test tubes. Growth usually occurs in from fifteen to thirty days.

The technique employed at present is as follows :

A solution of 3 per cent. sodium hydrate is used to wash the discharge from the ear or mastoid wound. This discharge is then allowed to stand in a sterile flask in an incubator from one to three hours, being shaken at intervals. When the flakes of mucus have been dissolved, we then thoroughly centrifuge

the mixture, and pour off the supernatant fluid. The precipitate is neutralised, as in the old method, with normal hydrochloric acid, using litmus as an indicator. The residue is then inoculated into a series of Miller's (10) culture media. The basis of this medium is an extract of the glands, spleen, and lymphatic tissue of laboratory animals. This material is employed because of the well-known preference of the tubercle bacillus for glandular tissue. Growth takes place in from ten to twenty days, much more quickly than where the original Petroff medium is employed. Subcultures are then made.

We have succeeded in isolating and cultivating to date nine cases of aural tuberculosis, using, as stated above, the antiformin method and Petroff culture medium in the early cases, and sodium hydrate, in conjunction with Miller's culture medium, in the late cases. We have, in addition, six cases of aural tuberculosis and one case of tuberculosis of the antrum of Highmore, all identified by stained smears made by the antiformin method. These last, together with three of the nine culture cases, were described in our preliminary report.

Thus far we have not attempted to differentiate the human and bovine types of organism because of the limited amount of time at our disposal. A brief synopsis of the histories follows:

CASE 1.—Samuel S—, aged fourteen. This patient was first seen on the operating table at the Manhattan Hospital. He was sent in for an adenoid and tonsil operation. On examination under ether, a small teratoma of the nasopharynx was found. His tonsils were small and buried. They were removed, and the teratoma was excised. At this time we were examining all children with chronic purulent otitis for tubercle. Finding that this boy had chronic discharging ears, a culture was taken. The patient was under-sized, but otherwise healthy in appearance. He was a mouth-breather, due to a right-sided septal deflection. A few small cervical glands were felt on both sides of the neck in the posterior group. There was no periotic glandular enlargement. His chest was pigeon-shaped. Examination of the lungs was negative. A radiograph of the chest failed to show signs of tuberculosis. There was moderate purulent discharge from both ears. The left ear had a large, non-marginal perforation. In the right ear there was a small central perforation. There was nothing suggestive of tuberculosis in either tympanic picture. Pus was washed from the ears into a single flask, and tubercle bacilli cultivated. Under cleansing treatment and instillations of alcohol, the discharge ceased in the right ear. The left side was still suppurating when last seen, though less profusely.

CASE 2.—Frank R—, aged three, a patient of Dr. Fowler in Dr. Phillips' clinic. An accurate history could not be obtained from the mother, who was unable to speak English. The child has suffered from a bilateral purulent discharge for two years or more. He has never had any of the ordinary infectious diseases of childhood. Examination: Pus in both canals. Left drum: Oval perforation in front of malleus handle. Right drum: Small round central perforation. No periotic or cervical glands. He has adenoids and hypertrophied tonsils. Tubercle bacilli cultivated from washings from ears.

CASE 3.—Italian child, aged four, from Dr. Phillips' clinic. Two years ago the child had measles, chickenpox, pneumonia. For nine months he has had a purulent

discharge from the right ear. The external auditory canal was filled with a large polyp. Tubercle bacilli were cultivated by Petroff's method.

CASE 4.—R. P——, aged eighteen months, a patient of Dr. John Rae and Dr. Culbert. The mother suffered from pulmonary tuberculosis. The child had extensive cervical adenitis and a positive von Pirquet test. Was operated upon for bilateral mastoiditis. The wounds would heal and then break down. At the present time the patient is being given tuberculin treatment. Positive culture obtained.

CASE 5.—L ——, aged twenty-two, a patient of Dr. Haskin. Typical objective tubercular otitis media, with a large defect in the tympanic membrane. Exuberant granulations. Pieces of dead bone came away in the aural discharge. On one occasion the incus was brushed out when the ear was being swabbed with a cotton applicator. This man at one time had a pulmonary lesion which is now quiescent.

CASE 6.—S. L ——, a patient of Dr. Cocks, in the service of Dr. Gorham Bacon, at the New York Eye and Ear Infirmary. This woman, aged sixty-six, has suffered from a right-sided aural discharge for thirty years. There was a large central perforation with granulations hanging down from the upper part of the defect. There was absolutely nothing suggestive of tubercular otitis in the clinical picture. The diagnosis of tuberculosis was made from the culture alone. At this time we were examining the aural discharge from all the chronic purulent cases which came to the clinic.

CASE 7.—M. T ——, aged five, observed by Dr. Cocks in Dr. Phillips' clinic. Patient has had a discharge from the left ear off and on since she had scarlet fever three years ago. Adenoids and tonsils were removed two months before. For the past three months the left ear has been discharging almost constantly. Discharge not affected by the adenoid and tonsil operation. The parents are well. One other child is healthy. Specimen of ear discharge was cultured for tubercle bacilli and found positive.

CASE 8.—T. F ——, aged five. Treated by Dr. Sharp. Otitis media purulenta chronica (left) has existed for two and a half years. There is a chronic discharge, which started with pertussis and earache. Three other children are all healthy. Patient has adenoids and enlarged tonsils. Referred for adenoid and tonsil operation. Left ear has a small non-marginal perforation from which a drop of pus oozes. Culture, positive.

CASE 9.—H. R ——, aged three, a patient of Dr. Cocks in the Throat service. One and a half years before, patient fell and received traumatism at inner side of eye over lower part of forehead. When first seen patient had a skin fistula at this point communicating with the ethmoid cells. An external radical operation on the ethmoid was performed, and the wound was closed. It has remained dry for one year. While in hospital the patient had a foul discharge from one ear. With a probe in the canal, a defect was found in the posterior canal wall. Knowing that we were dealing with a case of otitis media purulenta chronica, with necrosis of the canal wall, we exposed the mastoid and performed a radical operation. The wound healed and ear became dry. In the past year there has been occasionally some secretion from the middle ear for a few weeks at a time; then the ear heals again and remains dry. The culture was positive.

The following cases were examined by Dr. Dwyer by the antiformin method. The precipitate from the washing was stained for tubercle. These last seven cases were not cultured.

CASE 10.—Dr. Hubby's patient, in Dr. Phillips' clinic. Child, aged one. No family history of tuberculosis. This apparently healthy child had an attack of acute otitis. One week later Dr. Hubby examined the patient and found mastoiditis and facial paralysis. Operation revealed a broken down mastoid, full of pus. Following the operation, the wound showed absolutely no attempt at repair, although the child looked healthy. Pus from the mastoid wound during a post-operative dressing revealed tubercle bacilli. About one month later the child ceased coming to the clinic, and is said to have died from meningitis—presumably tuberculous.

CASE 11.—Dr. H. Beattie Brown's patient. A young woman, aged twenty, suffering from pulmonary tuberculosis, was sent to the Manhattan Hospital for extreme swelling and oedema over the mastoid. The cervical glands on the same side of the neck were markedly enlarged. Investigation showed furunculosis of the external auditory canal. After three injections with a staphylococcus vaccine the furuncular obstruction disappeared, and it was possible to obtain pus from the suppurating middle ear. Smears showed tubercle bacilli. One month's treatment with tuberculin produced a cessation of the aural discharge and complete disappearance of the glandular enlargement.

CASE 12.—Patient of Dr. W. L. Culbert. Mary M—, aged seven months. Family history negative. Both parents and three other children are living and well. Five weeks before coming to the clinic the child had a purulent discharge from the right ear. Three weeks later facial paralysis developed. The child had three operations: the first a simple mastoid operation in March, 1914; the second for suppuration of the parotid gland; and the third for removal of enlarged cervical glands. The mastoid wound healed very sluggishly. Pus taken at the time the wound was dressed revealed tubercle bacilli. Dr. Culbert has given the patient tuberculin injections.

CASE 13.—Dr. Haskin's case. J. R—, coloured man, aged twenty-nine. Chronic purulent otitis media. Typical tuberculosis of the ear. Small particles of bone could be picked away. Antiformin method and stained smears showed tubercle bacilli. This patient had tuberculosis of the lungs, and was referred to the Otisville Sanatorium.

CASE 14.—Dr. Haskin's case. McG—, aged thirty-two. Onset of suppurative otitis media, without pain. Rapid destruction of drum. Patient's physical appearance was excellent. He gave a history of having had rectal fistulæ.

CASE 15.—Dr. Dwyer's case of a baby, aged eighteen months, upon whom he operated for a subperiosteal abscess. There was a sequestrum involving the entire mastoid process. Smears from the pus showed tubercle bacilli. In this case there was a positive von Pirquet reaction. Death ensued from tubercular meningitis.

CASE 16.—Tuberculosis of the maxillary antrum, with tubercle bacilli in the washings from the antral cavity.

This case was presented before the Section on Laryngology by one of us (Cocks). The patient is a man, aged thirty-four, who had an arrested pulmonary tubercular lesion. By perforating the antrum through the inferior meatus of the nose, large tenacious clumps of muco-pus of a peculiar orange colour were obtained in the washings. Large numbers of tubercle bacilli were found in the precipitate.

One series of cases examined in the course of our investigation consisted of all children who came to the clinic during a certain period suffering from chronic purulent otitis media. The aural

discharge from these children—32 cases in all—was cultivated for tubercle bacilli, regardless of the clinical picture presented. The ages of the children varied from ten months to fifteen years. Among these 32 cases we found 5 positive cultures, showing, according to our figures, that 15.6 per cent. of all chronic purulent otitis media cases in childhood are tuberculous.

It seems fair to assume, from our investigations, that the cultural method is a reliable, accurate, and fairly rapid method of diagnosing aural tuberculosis, and one which should prove of considerable value in the further study of this important subject.

We wish to express our thanks to Dr. Gorham Bacon and Dr. Wendell Phillips for placing clinical material at our disposal, also to Mr. Schacter, of the College of Physicians and Surgeons, New York, for making cultures in some of the cases.

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CLINICAL NOTE.

THE LOSS OF HEARING FOR MUSICAL TONES AND ITS BEARING UPON THEORIES OF AUDITION.

BY DAN MCKENZIE.

I HAVE recently had an opportunity of examining one of those cases, happily rare, in which otosclerosis leads to a disorganization of the sense of musical pitch. As the patient was, unfortunately for him, an organist and teacher of music, he was only too well qualified to analyse and to appreciate the evil effects of this distracting change. Until its appearance his "ear for music" had been acute and reliable, in spite of the fact that in other respects he had, for more than twenty years, been very deaf indeed; and it was not until about six weeks before I saw him that he first discovered that he had suddenly become unable to check his piano-playing pupils when they struck a false note. His greatest difficulty, he thought, was with F sharp in *alt*, and in playing the organ he was less sure

of the four-foot than of the eight-foot stop—the former being an octave higher than the latter, which is the fundamental note. About the same time also he was informed that he himself could no longer sing in tune.

Examination corroborated his story. In taking the note from tuning forks, sometimes he was correct, at other times he struck a note about a full tone higher than I did, and in the case of one of my forks which had developed overtones from age and hard work, his attempts to reproduce the note only ended in confusion, although he correctly guessed that the fundamental was middle C. Thus he experienced difficulty in analysing or disentangling mingled tones.

We were finally led to the diagnosis of otosclerosis beginning to affect the labyrinth. It will be remembered that the symptom we are discussing is noted by Politzer ("Diseases of the Ear," fifth edition, Eng. Trans., p. 365) as a characteristic of this stage of the disease.

Several years ago I met with another case of disturbed tone-appreciation. This man, who also was an organist, had had a cold in his head, and one day when he was at practice he was surprised to find that the bass notes in the organ had all gone flat. Proceeding to investigate the cause, he found that the change was due, not to any fault in the instrument, but to the curious fact that in his left ear all the notes were sounding half a tone lower than in his right ear. In his case, the trouble was found to be a subacute catarrh of the middle ear, which was quickly cured, with complete restoration of the hearing to the normal. (In the first case, unfortunately, the prognosis is not good.)

Cases like these go to support the Helmholtz theory that the analysis of sound takes place in the cochlea, and not in the brain, as the Rutherford "telephone" theory seems to suggest.

In neither of the patients was there the slightest sign of any cerebral or other central nerve lesion, consequently the difference between the cases must have been due to the difference in situation of the lesion in the ear.

In the first case the disease was affecting the labyrinth, and had destroyed the "musical ear" by a haphazard singling out of some notes, especially or solely.

In the second case, on the other hand, the cause was tympanic, and the effect produced was that of a uniform lowering in pitch of *all* the musical sounds heard by the affected ear.

Now it seems to me that, if the "telephone" theory were correct, any lesion in the ear, whether tympanic or cochlear, of a kind to affect tone-hearing, would induce just such an effect as was perceived by the second patient. In addition to a loss of acuteness of hearing—the equivalent of a reduction in loudness of the sound—there would be induced a reduction in the rate of vibrations per second by the retarding action upon the transmission of sound due to the lesion, whether that transmission was effected by a physical or by a nervous agent. But, as in the first case, the hearing for musical tones had been disorganised differentially, and not uniformly, and as in that case the disease was labyrinthine, it is, to be sure, difficult to escape from the conclusion that it must be in the cochlea—the peripheral sense-organ—that the analysis of musical sounds is made.

More than one clinical fact has of late been found to lend support to the Helmholtz theory, and to those this one also may evidently be added, that disease situated in the labyrinth, in addition to causing deafness of the familiar kind, may also destroy the faculty of appreciating musical tones.

ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

March 3, 1916.

President: DR. J. W. BOND.

The Histological Features of Rhinophyma (Epidiascopic Demonstration).—Sir William Milligan.—Male, aged fifty-eight. The enlarged and lobulated appearance of the nose has existed for years. He has been troubled with chronic acne rosacea of the face for some time past. He drinks beer, but not in excess. The heart, lungs, and kidneys are normal. Cases of rhinophyma are not rarely seen, but are not often operated upon, because they are thought to be very vascular. Yet, although some of my cases have been vascular, the bleeding has never been enough to worry about. The exact aetiology is not known. Some pathologists consider that a rhinophyma is a soft fibroma of the skin, others, that it is the result of an angio-neurosis, others, again, that it is the terminal result of acne rosacea. Ollier calls it "elephantiasis des buveurs" because he has found it to occur amongst those who drink very freely. That has not been my experience. I think it is the result of acne rosacea, and in one or two of my cases the disease has been present in other parts of the body.

Lantern slides of the patient's appearance before and after operation are shown. One can see the openings of very large sebaceous glands, and there is always a quantity of sebum upon the skin. This man has had rhinophyma a number of years, and came to the Royal Infirmary, asking whether anything could be done for him.

I made an incision down the centre of the dorsum of the nose, and two lateral incisions round the side of the nose, and partly with a very sharp knife and partly with a very sharp razor stripped all the lobulated and hypertrophied tissue from the side of the nose, being careful not to injure the cartilages. During the dissection the nose was kept plugged with pledgets of wool to keep it distended. A skin-graft was taken from the patient's leg, to cover immediately the whole raw surface. I then covered the graft with gold leaf and put on a simple dressing, fixed it with plaster, and left it there five days, when it was found that the graft had taken completely.

Histology.—The surface epithelium is intact, and in most places not thickened at all. The main thickening occurs in the subcutaneous tissue, where there is considerable hypertrophy. Many of the sections show a deposit of fat in the subcutaneous tissue. There is an interstitial hyperplasia, the blood-vessels are enlarged, as also are the lymphatics, and there is an enormous dilatation of the sebaceous glands—to four or five times their normal size. Some observers say they are also increased in number. The lobulated condition is due to thickening of the subcutaneous tissue. I think the condition should be operated upon, because it is so unsightly. I have not seen a case in a female, though believe cases have been recorded.

Mr. Dawson: I show a photograph of a man on whom I operated a few years ago. He was aged seventy-three. The condition begins

suddenly, with flushing of the nose, which is first temporary, and then becomes permanent, and hyperplasia occurs round the blood-vessels. There is a hyper-development of the sebaceous glands, so that instead of being about $\frac{1}{8}$ in. in depth, they are $\frac{1}{2}$ in. to $\frac{3}{4}$ in. deep. I think skin-grafting is not necessary in these cases: if some true skin is left, there will be no scar; there was none in my cases.

Dr. WILLIAM HILL: Captain Cope operated upon such a case of aene rosacea, and he used a razor and simply shaved off what he judged to be a sufficient amount of tissue, leaving enough for a normal-sized tip. He did not graft, but simply used a little plain water dressing. He did not meet with much bleeding, and what there was could be dealt with by pressure. Mr. Dawson's photographs bear out what can be done without skin-grafting.

Major KENT HUGHES: Recently I had a similar case, but a little more aggravated in degree. There were three lobes, two of which seemed to belong to the same growth; that on the right side was separate. I operated only on the right side. There was no excess of sebum on the skin. I was not forced to skin-graft, because I could get enough skin from the root of the tumour to restore the shape of the nose on that side. I put in a few stitches and sent the patient home. I employed local anaesthesia. The operation was done about three weeks ago.

Dr. WATSON WILLIAMS: It will be interesting to learn the later history of this case, especially as to whether the use of part of the skin for the graft has led to recurrence. The result obtained by Sir William Milligan after skin-grafting with healthy skin from another region is so admirable that it tempts one to employ the same measure, and one feels that grafting must expedite recovery when so considerable an area has to become covered.

Mr. E. D. D. DAVIS: The late Mr. Stanley Boyd operated on a number of these cases by shaving the redundant tissue with a razor, and he described it as like paring a pear. His results were fairly good. I had such a case five years ago. I made an incision parallel with the edge of the nostril and over the bridge of the nose, and after removal of the growth stitched with horsehair. The case was very satisfactory. The patient was a publican. I saw him three weeks after the operation, but not since, so I cannot say whether there has been any recurrence.

Dr. KELSON: What anæsthetic was used? It is an important point, because these patients in many instances have visceral disease. The tissue removed is very insensitive, for a surgeon told me he had operated upon several without any anæsthetic, and the procedure was borne very well.

Sir WILLIAM MILLIGAN (in reply). I do not lay great stress on skin-grafting, but I think it expedites the healing process, and may be a factor in preventing recurrence. I do not agree with making use of the skin in the immediate locality, because it is difficult to tell whether the hyperplastic process is not tracking along the subcutaneous tissue. I have not always skin-grafted in these cases; sometimes I have simply shaved off the hypertrophied tissue. The anæsthetic used was, I believe, open ether, followed by chloroform.

Removal of a Fish-bone from the Larynx in Adult Females.—

Sir William Milligan.—*Case 1.*—Patient, a female, aged forty-eight. She inhaled the fishbone during a meal. There was a severe fit of coughing and slight blood-stained expectoration.

Case 2.—Patient, a female, aged thirty. The same history as in Case 1.

Dr. DUNDAS GRANT: I should like to know how the large bones were lying in the larynx.

Sir WILLIAM MILLIGAN (in reply): The larger fish-bone was lying across the larynx, more or less embedded in swollen mucous membrane. It had been in the larynx five or six days. The small fish-bone was lying turned up under the left false vocal cord, with the point embedded in the mucous membrane of the opposite side of the larynx.

Foreign Bodies removed from the Bronchi by Upper Bronchoscopy.—Thomas Guthrie.—(1) *Piece of Mutton-bone.*—A boy, aged ten, while eating his dinner, was seized with a violent fit of coughing which subsided after a few minutes. Two days later there was rise of temperature, cough, and expectoration, and signs of pneumonia gradually developed in the left lung. Nine days after the accident, upper bronchoscopy under general anaesthesia showed the bone lying in the left bronchus about $\frac{1}{2}$ in. from its orifice. Removal by means of Brünings's forceps was followed by rapid recovery.

(2) *Piece of Metal Pencil-case* (with radiogram).—The patient was a boy, aged eleven. A piece of a broken pencil-case had been inhaled on the previous day and lay with its hollow end upwards in the branch of the main bronchus leading to the lower lobe of the right lung. The only difficulty consisted in the fact that on grasping one edge of the object with Brünings's forceps its opposite sharp margin tended to become embedded in the bronchial mucous membrane.

(3) *Glass-headed Pin* (with radiogram).—The patient was a girl, aged three and a half. The pin, which measured slightly over 2 in. in length, lay head downwards in the left main bronchus, the point being at the carina. It was said to have been "swallowed" two days previously. Removal was effected by means of Paterson's forceps passed through a 5 mm. tube.

Mr. GUTHRIE: The only difficulty in the case of the pin was that when one had the forceps in the tube, the tube being only 5 mm. in bore, it was practically impossible to see the point of the pin. I should like to hear where I can get narrower forceps. I found that Paterson's was the only forceps with which it was possible to do anything. I could not get hold of it with Brünings's forceps. Even Paterson's forceps filled up the tube so much that it was like groping in the dark.

Mr. TILLEY: There are several recorded cases in which the foreign body has dropped into the left bronchus. Yet we are told that the right bronchus is in a more or less continuous line with the trachea. But it is not always so. In the last patient I inspected to-day I saw the bifurcation clearly, and I could see almost directly into the left bronchus. Three times have I removed a foreign body from the left bronchus, and I find my hospital cases are about equally divided between removals from left and right bronchi. There is an excellent long forceps with a narrow shank, invented by Casselberry, of Chicago. It is made of strong steel, and grips very firmly.

Dr. WILLIAM HILL: Twenty-five years ago a paper was published by Dr. Cheadle and Mr. (afterwards Sir Thomas) Smith¹ giving an analysis of a number of recorded cases, showing that there was no predilection on

¹ *Med-Chir. Trans.*, 1888, lxxi, pp. 113-124.

the part of a foreign body to become impacted in one bronchus more than in the other. But I think more foreign bodies enter the right bronchus and yet are more easily coughed up from there, while impaction is more likely to ensue in the left bronchus, since it is smaller. It has been suggested that the left bronchus is a continuation of the trachea as regards direction, but that the right is continuous in respect of size. Perhaps the point can be settled by someone from observations made in the *post-mortem* room.

Dr. JOESON HORNE: When a hollow cylindrical foreign body, such as a metal pencil-point protector, becomes lodged and impacted in a bronchus, it is difficult to seize the ring of the tube with a forceps, the teeth of which are in opposition as usual. A forceps with the serrations on the external surfaces of the jaws, when inserted within the cylindrical body and then opened, would secure a firmer and more successful hold of the body.

Sir WILLIAM MILLIGAN: When one has not the most convenient instrument at hand, it is of great advantage to use what one has with the aid of the fluorescent screen as a guide. I have found operating with the aid of the "screen" in difficult cases a great advantage.

Large Naso-antral Polypus.—Sir William Milligan.—Patient, a male, aged twenty-one. There is a history of severe nasal obstruction for years. The growth is seen to occlude the left nasal passage completely and to hang down into the pharynx below the level of the margin of the soft palate. The man was admitted into the Army with practically complete nasal obstruction, and after a route march was so exhausted that he was sent to hospital, where the growth was discovered. While he was under the anæsthetic, I passed my finger through a large opening into the maxillary antrum. The growth was removed by torsion. That is what I usually do in the first instance. If there is a recurrence, I open the antrum through the canine fossa and scrape the site of origin.

Dr. DAN MCKENZIE: I suggest that this be termed *antro-nasal* polypus. The antrum deserves precedence, because the polypus grows there.

Dr. DUNDAS GRANT: I ask whether transillumination was tried in this case. Mr. Lambert Lack showed us a case in which the antrum was full of polypi and in which transillumination revealed no abnormality. In the cases of post-nasal polypi I employ transillumination as a routine procedure, to help in deciding whether the polypi are growing from the antrum, but Mr. Lack's observation upsets the certainty as to its value.

Dr. WATSON WILLIAMS: My method of ascertaining whether the antrum contains polypi is to use the suction syringe, which I have shown several times. It is more certain than transillumination. As soon as you attempt to withdraw fluid from the antrum, the polypi rise to the mouth of the needle and block it. In most cases operation confirms the indications of this syringe.

Mr. TILLEY: A patient's antrum if filled with polypi will be dark to X-rays, even though ordinary transillumination shows it to be clear.

The PRESIDENT: I can confirm that.

The Treatment of "Functional Aphonia" in Soldiers from the Front.—Sir William Milligan.—The patient was "buried" as the result of a shell explosion. He was removed to hospital in a profound degree of shock. There was complete loss of voice. I have had a number of very troublesome cases of aphonia among soldiers; the worst type has

been when the soldier has been temporarily buried as the result of a shell explosion, and has been rescued very much "shocked." In several cases there has been great difficulty in restoring the voice. Ordinary methods have been tried, such as drugs, putting a brush into the larynx, and using electrodes. When these means have failed I have had the patient put slightly under ether, and when he has partially come out of it I have introduced a laryngeal spatula into his larynx and moved it about. Shouting is the usual result, and the continuance of this shouting is encouraged until the man is quite aware that he is shouting. I do not know whether there has been any recurrence of the aphonia after this treatment, because on the voice being restored the patient is taken away.

Mr. TILLEY: A young woman suffering from functional aphonia used to attend the Golden Square Hospital and she knew all about the ordinary methods of treatment, for she had been to a number of hospitals. She was lightly anaesthetised, and a strong faradic electric current was used at that stage of recovery when she had no control over her voice, and the screaming to which she gave vent was something to remember; the current was applied until she could have no doubt she was hearing her own voice. She retained her voice for some twelve hours and then insisted on leaving the hospital. There is much functional aphonia in the men coming from the trenches to the base: some of them recover on their way across the Channel. We get a certain number of them over here, and my experience is that it is unwise to begin to try to treat them with the faradic current, as we should an ordinary civilian patient with functional loss of voice. We had two cases in hospital who went down on the "Royal Edward"; one was in the water five hours, the other two hours, and the condition of their nervous system was pitiable. To treat the patients in such cases straight away by active measures I regard as a mistake. After keeping them quiet and comfortable for two or three weeks, local treatment may be undertaken with considerable prospects of success.

Dr. F. DE HAVILLAND HALL: I have had a case similar to Mr. Tilley's. It was that of a female; she was put under ether, and on coming out shouted loudly, but lost her voice again. That was thirty-five years ago. I heard of her again some weeks ago, and she was still aphonic. Sir Morell Mackenzie used to say you should attend to the general condition of the patient before trying to restore the voice.

Dr. DUNDAS GRANT: I agree that these patients should be allowed a period of complete rest before an attempt is made to restore the voice by violent means. At the West End Hospital for Nervous Diseases I have practised "re-educating" them, in the same way as is done in teaching deaf-mutes, by coaxing them to speak by placing the patient's hand under one's own larynx and uttering a strong guttural sound, then placing one's hand under their larynx and asking them to produce the same. Next, by getting them to put their mouth into various shapes to express various vowels, the method of producing the voice can gradually be re-awakened. They should be taught to breathe properly, because they are sometimes so shattered that this is a difficulty for them. I consider this method gentle, humane, and scientific, and the house physician has had several successful results from its employment in cases under the care of Dr. Palmer and the other physicians. There has not yet been a case which has failed us, but some take a long time before yielding to treatment.

MR. MARK HOVELL: In these cases many patients feel that they will never be able to speak again, and it is important to give them confidence by the assurance that their voice will come back and that they may find perhaps that it has returned on awakening one morning.

DR. JOBSON HORNE: We have now seen a good many soldiers from the Front suffering from aphonia. The exhibitor of the present case has wisely placed the phrase "functional aphonia" in quotes. In every case of aphonia from the Front, not due to traumatism, it is of first importance to exclude a diagnosis of pulmonary tuberculosis. Carefully taken notes of the family and clinical histories, reports of the examination of the sputum, of the physical and X-ray examinations of the thorax, and a four-hourly temperature chart are indispensable in arriving at a diagnosis. Many years ago¹ I pointed out that by dismissing aphonia as "functional," "nervous," or "hysterical," a most valuable premonitory sign of pulmonary tuberculosis is likely to be overlooked at a time when the disease is curable.

MR. STUART-LOW: I understand that at some military hospitals specialists have been appointed to employ hypnotic and suggestive influences for voice restoration, and that this has been found to be very effective, especially in cases of soldiers who have returned from the Front after having been in action.

MR. GUTHRIE: I recently had a case of absolute mutism, and the patient failed to respond to hypnotism; but finally he yielded to a process of re-education, in the manner Dr. Dundas Grant has just mentioned.

THE PRESIDENT: There may be cases in which the patient is unwilling to speak after the shock has passed off.

SIR WILLIAM MILLIGAN (in reply): I do not wish it to be thought that the method I have described in this case is a routine method. It has been employed entirely in those cases which have remained in hospital week after week without improvement. My practice has been to keep the patient in bed and give bromides and valerian. If these do no good, in a week or so I pass a brush into the larynx; and then if that fails, the battery is used. I agree with Dr. Jobson Horne about the term "functional," but I do not know what else to call it. [Dr. HORNE: Explosion aphonia.] We encourage patients with the idea that the voice will come back, but there is a class of cases which resists that encouragement, and it is in this class of cases the method I have described appears to me to be particularly valuable.

The Treatment of Gunshot Injuries of the Larynx where "Webbing" of the Vocal Cords has taken place.—SIR WILLIAM MILLIGAN.—My difficulty has been to prevent the cords adhering to one another after the web is divided. I refer to those cases in which the larynx has been much mutilated and there is a cicatrix uniting the cords to one another. Mere division is of little use. In a week you can see the web re-forming. To prevent this, I have had a little instrument made, which consists of a tracheotomy tube, with the inner tube slit down the greater part of its curve. The perpendicular rod is a screwed rod, and on it revolves an equilateral triangle of metal with the sides grooved. By the "direct" method this screw arrangement is passed

¹ "The Pathogenesis and Earlier Clinical Evidences of Laryngeal Tuberculosis," *Lancet*, August 20, 1898.

down through a laryngeal spatula through the hole in the tracheotomy tube, so that its bulbous end lies in the tube itself. An assistant passes the inner tube through the outer one, so fixing the perpendicular rod. By means of vision one judges when the cords are lying opposite the little grooves of the triangular platform. Then a thread is passed through the eyelet and moored to the patient's ear. It is drawn fairly tight, and examination is again made to see that the platform is in an accurate position. There is at first a little irritation, but this soon passes off and the instrument may be left in for days. It is well to examine the patient every two or three days, to see that accurate position is maintained. I have found the little apparatus of considerable value in cases of severe mutilation of the larynx, because unless something is kept between the vocal cords reunion will occur.

The PRESIDENT: For how long after ceasing to use the appliance can reunion of the web be prevented?

Dr. JAMES DONELAN: It has been fortunate for Sir William Milligan that probably in the large majority of his cases there was very little alteration in the form of the vocal cord. I think the apparatus now shown would not be so useful in cases where there is much cicatricial thickening. Where such a condition exists the portion of the apparatus for keeping the cords open during healing would be more generally useful if shaped somewhat like an O'Dwyer's tube with a double head and about 1 in. long. It will be of some importance to learn how long the cases treated in this manner have remained free from re-union after removal of the apparatus.

Mr. E. D. D. DAVIS: Does not leaving the silk thread attached to the part in the larynx cause ulceration of the epiglottis? In the case of an intubation tube, if the thread is left on, a linear ulcer of the epiglottis develops, and that is a disadvantage.

Mr. W. STUART-LOW: A few weeks ago I showed a case of typical webbing of the larynx, and asked for members' experience in such cases. Dr. Peters said that he had met with a number of such cases, and found that improvement took place if they were not interfered with. It is now six weeks since my case was shown, and it has considerably improved, although there is still a large web uniting two thirds of the length of the vocal cords.

Dr. H. J. BANKS DAVIS: Is this instrument meant to prevent the increase of the web, or to cause the absorption of the web by pressure after its introduction into the glottis?

Sir WILLIAM MILLIGAN (in reply): The longest period during which a case has been so treated is five months. I agree that there may be some change at the end of a year. With regard to subglottic thickening, those webs have not been very thick; they are comparatively recent cases. They have been less than $\frac{1}{4}$ in. in thickness. But the same method would be suitable for thick webs; it is something which is adjustable that is needed. I have only once seen ulceration in the epiglottis in a case so treated. With regard to the policy of leaving these cases alone, it must be remembered that they are cases of bad injury, and if something is not done the patient will always have to wear a tracheotomy tube. These webs differ from those usually seen in civil practice, in which there is a small adhesion between the anterior edges of the cords. It is wise to leave the latter cases alone. The apparatus helps absorption to some extent, but it is meant to keep the cords apart sufficiently long to enable the cut surfaces to epithelialise.

Radiogram showing an Epi-hyal Bone in a Human Subject—Thomas Guthrie.—The patient, a man aged about fifty, suffered from carcinoma of the upper end of the œsophagus. The radiogram by Dr. Oram shows a chain of bones apparently representing a complete "hyoid arch," composed of the basi-hyal (body of hyoid), cerato-hyal (short process of hyoid), epi-hyal, and stylo-hyal. The condition is similar to that seen in the dog, a drawing of which is shown.

Rapidly Growing Epithelioma of the Palate.—W. Stuart Low.
—A man, aged fifty-two, who came to the clinic three weeks ago, complained of a burning feeling in the throat, particularly on swallowing food. There was then an ulcerated patch, the size of a sixpence, at the middle of the right half of the soft palate; this has extended rapidly down the anterior palatal pillar and across to the base of the uvula. A piece of the growth was removed and submitted to Dr. Wyatt Wingrave, who pronounced it to be a rapidly growing epithelioma. There was a considerable mass of hard glands at the angle of the jaw on the same side, but this has become much smaller and less indurated since potassium iodide has been given. The exhibitor has never known radium to have any beneficial influence on such cases, and asks for an expression of opinion from members on this point in the treatment. This patient, when first seen, suffered from well-marked pyorrhœa alveolaris, and he has been a very heavy smoker. He has had syphilis. Being a night porter at Billingsgate market he has been accustomed to hot drinks, such as scalding coffee taken very rapidly, especially in very cold weather. The exhibitor has found the same habit common in similar cases of malignant disease of the throat, and considers it very likely that such frequent scalding of the fauces may be a contributory cause of cancer.

Dr. DAN MCKENZIE: There is a remark at the end of the notes on this case which I regard as important. I think many cases of cancer of the pharynx and œsophagus are due to heat. Some time ago I used a thermometer to find out the temperature of the various liquids which people are in the habit of drinking hot, and the result amazed me. Liquids of a temperature which could not be borne on the skin are easily tolerated in the mouth, and 130° F. to 150° F. is the usual range of such hot liquids. At the higher of these temperatures it is necessary to sip. Though the mouth can stand such a temperature, the œsophagus seems to be devoid of sensation for heat. There is a sensation for temperature, but that is only experienced when the liquid descends to the cardiac end, where it is held up a little time before trickling through to the stomach. The habit of swallowing liquids very hot as a contributory factor in the production of cancer of these parts is not above suspicion. We probably enjoy the stimulant effect of such liquids, and educate ourselves to a tolerance of them. The temperature of a hot bath is only about 101° F. The profession and the public should be educated as to this danger.

Dr. JOHNSON HORNE: I think the public is already "educated" on this matter. A layman recently told me that in China, whilst the men suffer from cancer of the gullet the women seldom do, and the explanation given was that a woman dare not touch the hot rice until her lord and master has satisfied himself, by which time the rice is cool. With regard to the diagnosis of this case, I understand that the man has improved considerably under iodide of potassium: there is a history of syphilis, and the Wassermann reaction is positive. The glands in the neck have subsided considerably under the drug, and I think, therefore, it would be as well to continue that treatment, and perhaps we can see the case again.

MR. N. PATTERSON: I think this is an excellent case for operation, and surgical procedures ought to be carried out at once. The growth could be removed with the knife, but diathermy would yield the best results. The glands should, of course, be dealt with as well.

MR. TILLEY: I was surprised to find the diagnosis to be epithelioma; but if I were an examinee and had only one string to my bow in the case, I should say that the lesion is syphilitic rather than malignant disease. With regard to the beneficial effect of radium in these cases, it varies very much. I have seen some cases of marked and extensive malignant disease clear up within a fortnight after radium had been embedded within the diseased area. In others I have seen nothing but harm result. And I do not know of any guide as to when it should be applied. I have not seen squamous epithelioma within the mouth cured by radium, although I have seen it become cleaner and possibly reduced in extent, but this only for a comparatively short time.

THE PRESIDENT: There is the possibility that both syphilis and malignant disease coexist in this case. We have the result of the microscopical examination by the expert, and the feel of the growth is a little harder than in the case of a syphilitic lesion. A rapid and thorough antisymphilitic treatment is the proper course at present; this should be followed by diathermy. I have had two cases recently in which I was assisted by Mr. Patterson, and so far the results of diathermy have been better than I think could have obtained in any other way. It is yet too soon to know what the final result will be, but there has been a period of at least five months of ease in patients aged seventy-four and sixty-nine respectively.

MR. W. STUART-LOW (in reply): It is not because I have had any doubt about the diagnosis that I have shown this case, for, as stated in the notes, I had a piece of the growth punched out and given to Dr. Wyatt Wingrave, who pronounced it to be a rapidly growing epithelioma. The glands were of stony hardness, but under treatment by mercury and iodide of potassium there was some improvement in the condition of the throat, and the hardness of the glands became very much diminished. A Wassermann reaction was also taken and found positive, as stated in the notes of the case. I have, therefore, no hesitation in saying that the case is a combination of syphilis and epithelioma, as remarked by the President. It has been my experience that most cases of cancer of the throat have had a syphilitic history, and I published in the *Lancet*¹ a list of fifteen patients, all of whom had had syphilis before the onset of malignant disease; consequently, I look upon syphilis as a step towards cancer. I frequently use diathermy in malignant disease of the throat, but, although it has a mitigating effect for a time, I have never yet found it curative. The case will be shown again.

Aphonia in a Soldier.—Coubro Potter.—A corporal, aged twenty-two, who had been in the trenches for about six weeks, developed what he described as a cold, with loss of voice. He was admitted into hospital, and has been an in-patient for four months. The family history is of no importance. Present condition: Dr. Stanley Noble examined his chest, and reports that he cannot find any abnormal physical signs. His sputum has been examined several times, and no tubercle bacilli have been found. The X-ray examination reveals nothing abnormal. His

¹ "Mucin and Malignancy: Facts and Theories" *Lancet*, 1902, ii, pp. 808, 809.

temperature has always been normal, with no suggestion of an abnormal evening rise. The man goes about, and states that he feels well. Upon examination of the larynx the tip of the epiglottis is seen to be somewhat thickened, the false vocal cords are swollen and congested, the true vocal cords do not approximate well in the posterior region, and the general impression given is that of subacute laryngitis. No sign of ulceration is present; in the inter-arytænoid region there is swelling of the mucous membrane. The pharynx is generally congested. In the nose there is a septal spur, but no nasal obstruction. The case is shown with a view to obtaining opinions as to diagnosis and treatment. I am inclined to look upon it as a case showing very early tubercular tendency.

Dr. H. J. BANKS DAVIS: Mr. Potter has asked me to show this case for him. The vocal cords are rounded and pink; Wassermann's reaction is negative; there are no tubercular signs in the chest. The exhibitor particularly wished to know whether members thought the edge of the epiglottis was affected or not.

Dr. DUNDAS GRANT: I think there is in this case well-marked functional aphonia. There is a perverse movement of the cords: as soon as the patient is instructed to phonate, the cords appear to be coming together, and the arytenoid cartilages actually meet, but when the vibrating part in front of the vocal processes comes forward, the arytenoid cartilages at once move away by a perverse action of the lateral crico-arytænoid muscles, as if there were paralysis of the arytenoid muscle. There is thus produced that triangular air space behind the vocal processes which is characteristic of some cases of hysterical aphonia. The cords are much congested, and the laryngitis would account for hoarseness, but not for the aphonia. Sir Morell Mackenzie used to teach that it was important first to subdue the laryngitis when present with functional aphonia. In this case the laryngitis should be treated and then the methods we have been discussing to-day for functional aphonia might be tried.

Dr. JOHNSON HORNE: The remarks made by me with reference to Sir William Milligan's case of "functional aphonia" are also applicable to this case.

Mr. TILLEY: I examined this patient before he had been tired by a series of examinations, and I do not agree that it is functional aphonia. He has a very bright red palate and an oedematous uvula; the vocal cord, larynx and epiglottis are red, and the last-named is somewhat thickened at its upper edge. I think it is chronic laryngitis, tending to the hyper-spastic type. He is smoking an enormous number of cigarettes a day, and if they were vetoed and treatment with iodide of ammonia carried out, I think he would do well. If it were functional aphonia, he would be able to cough, but he cannot.

Major KENT HUGHES: I think it is a tubercular infiltration, as distinct from tubercular laryngitis; there is swelling of mucous membrane, especially in the interarytænoid space. He will certainly be found to have a slight though constant temperature. I have watched this type of case for the past ten years, and sometimes as long as three years after they come complaining of sore throat, they develop physical signs in the chest—sometimes they develop them as early as two or three months after the first symptoms. The early change in the thickness of mucous membrane is seen when the arytenoids are beginning to come together. The condition may stop at that until late in life. I am sure there is a danger that, if left alone, this patient may develop pulmonary phthisis.

The PRESIDENT: The man has very marked laryngitis, especially at the posterior brim, and the ventricular bands are swollen. I think the behaviour of the arytenoids is brought about by some swelling in them, or infiltration of muscle. It may turn out to be tubercle, but it certainly is not a case of pure functional aphonia.

Dr. WATSON WILLIAMS: I think it is often very important to investigate the condition of the nasal accessory sinuses in cases like the one under discussion. Cases due to trouble there may so closely simulate functional aphonia as to be mistaken for it, the cause being constant reinfection from a latent sinusitis. One patient, a soldier, was brought to me for functional aphonia, because he did not get better and he was losing so much time. I found a latent infection of one antrum at least, and two days after simply washing it out the voice was restored. There was no shock before the aphonia came on. I recommend washing out the maxillary antra in the case shown and examining the secretions.

Mr. CLAYTON FOX: Did the aphonia come on suddenly or gradually? If suddenly, probably the condition is psychic in origin. The jerky movements of the cords on phonation are due to swelling of the mucosa and inflammatory infiltration of the muscles.

Dr. H. J. BANKS DAVIS (replying for Mr. POTTER): The voice became worse slowly and gradually. Personally I was unable to see the cords, the patient being tired and weary of examination; he has enlarged tonsils, and probably adenoids as well, and I should suggest their removal as a preliminary.

Traumatic Injury to the Nose.—Coubro Potter.—A. P.—, private, was shot through the nose and the left eye. The injury to the nose is peculiar; the nasal bones have both been depressed but remain whole, although the bullet entered from the side; the nasal septum has been partly destroyed. I should like to have opinions as to operation, whether the nasal bones should be raised and the deformity thus removed, or should the case be left alone?

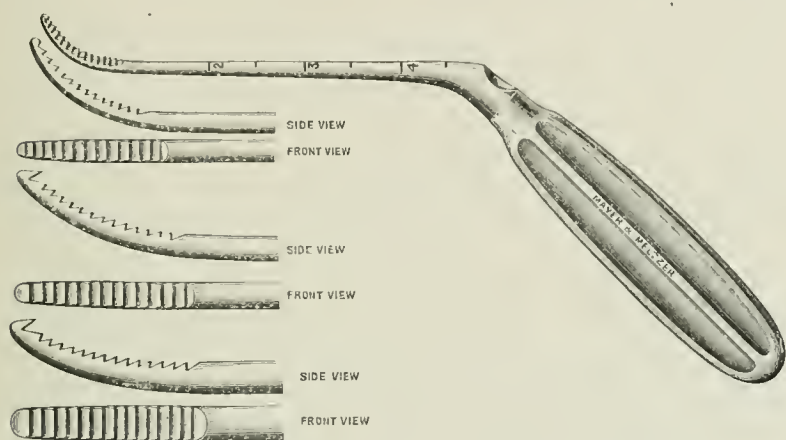
Mr. TILLEY: As the deformity is so handicapping, I think it would be possible to make an incision down the side of the nose, reflect the soft parts, and then raise the nasal bones, which are now crushed in. The lower part of the nose would be more difficult to treat, because of the loss of cartilage there. A plastic operation might be the best solution in dealing with that region.

Bilateral Dacryocystitis in a Syphilitic Child.—Coubro Potter.—Q. H.—, aged twelve. No history is obtainable as the child was sent me from a workhouse infirmary. On examination both sides of the nose were full of offensive-smelling crusts, and the septum was almost completely gone; there was atresia of the left nostril and scarring of the postpharyngeal wall. The ovula was absent. Opinions are asked as to the method of treatment.

Dr. H. J. BANKS DAVIS (for Mr. POTTER): The child is a syphilitic subject, and Mr. Potter wishes to know whether it is advisable to operate at all. If so, should the operation be done externally or internally? One nostril (the left) is occluded. I suggested that operation should be internal on one side and external on the other, and that the child should be treated first with antisyphilitic remedies.

Dr. WATSON-WILLIAMS: My experience is that operations in syphilitic cases pursue a less favourable course than in non-syphilitic ones, and it

is important to give antisyphilitic remedies first. I suggest in this case, after antisyphilitic treatment, an external operation on the right lacrymal sac to make it drain into the nose, in the following manner: (1) Make a linear incision below the inner canthus, corresponding with the lower margin of the lacrymal groove; (2) with a raspatory turn the sac from within outwards so as to expose the groove, then push the raspatory through the thin bone at the bottom of the groove into the nose; make a free opening into the nose here; (3) remove the inner and deep wall of the sac corresponding with the communication made with the nose, and close the external wound carefully. In this way one practically does a West's operation from without, and in such a narrow nose as this child has it would be much easier and more likely to succeed than a per-nasal operation. If successful on the right side, subsequently it might be done on the other side. I have done such an operation with excellent results and without leaving any perceptible scar.



Watson-Williams's rasps for the per-nasal frontal sinus operation. There are three sizes: the smallest with no hook, but more fully curved than the second and third sizes, which have the hooked terminal. Note, size 1 should have twenty teeth to the inch, sizes 2 and 3 should have fifteen teeth to the inch. The complete rasp above is drawn to half scale; the terminals are shown in full size.

Rasps for the Per-nasal Frontal Sinus Operation.—P. Watson-Williams.—The three rasps shown are those now used by the exhibitor for the per-nasal frontal sinus operation, practically to the exclusion of his rotating burr and sliding punch forceps. They are in three sizes: small, middle-sized, and large. The small rasp is the same as that used and shown in 1914, the only modification being the addition of a *hooked end* to the two larger sizes. Trifling as it may seem, the exhibitor has found this small modification of the greatest value to the operator, inasmuch as it enables the reduction of the nasal crest to be rapidly brought about by downward rasplings with considerable force, because the rasp is arrested as soon as the hooked termination reaches the backward and projecting crest, thereby preventing the damage which would result to the nasal mucosa through the rasp suddenly slipping downwards into the nasal passage.

You will notice that the curve of the small rasp is reduced in the middle size, and still further reduced in the larger-sized rasp, as with the reduction of the crest the entrance to the frontal sinus becomes more and more straightened.

These rasps are also found to be of the utmost service in performing the per-nasal maxillary sinus operation by the method described and illustrated by the exhibitor in the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY in May, 1914.

Growth removed from Right Tonsillar Region.—J. W. Bond (President).—I removed this growth to-day from a woman, aged forty-nine, from the right tonsillar region. She was shown at the last meeting. The tumour came away by the mouth, piecemeal, without splitting the cheek, interfering with the jaw, or tying the carotids. The weight of the growth is $3\frac{3}{4}$ oz.; it extended backwards to the internal surface of the mastoid.

Abstracts.

PHARYNX.

King, James Joseph.—Preliminary Report on the Connellan-King Diplococcus Infections of the Throat. "Laryngoscope," 1915, p. 229.

CASE 1.—Physician; had suffered from sore throat and general pain. Temperature, 105.6° F. Delirium. Examination showed follicular tonsillitis; urine contained albumin, hyaline and granular casts. Film preparations from the tonsil crypts showed a diplococcus (Connellan-King). Nephritis, fever, and toxæmia persisted until the patient received three injections of an autogenous vaccine. CASE 2.—Also a physician; had a mild tonsillitis in April, 1914, which apparently was well in a few days. In June the patient had arthritis of ankle and knee, and later endocarditis and nephritis. In December the above diplococcus was found in pure culture in the tonsil crypts. Three injections of an autogenous vaccine cleared up all infection. CASE 4 is even more remarkable. A lady complained of severe asthma following a very mild tonsillitis. The same diplococcus was isolated in pure culture from the crypts of each tonsil. Three injections of autogenous vaccine cleared up all asthmatic symptoms. There had been no recurrence to the time of writing.

Fourteen other patients, with various symptoms, were reported. All of the fourteen, who had been treated with autogenous vaccines, were very gratified. J. S. Fraser.

Smith, Harmon.—Naso-pharyngeal Sarcoma and Naso-pharyngeal Fibroma. "Laryngoscope," 1915, p. 224.

CASE 1.—Male, aged forty-three, complained of nasal obstruction of five months' duration. Before admission he had also had pain in the left temporal region, and left ear. This had been relieved on one or two occasions by severe attacks of epistaxis. Anterior rhinoscopy showed nothing abnormal anteriorly, but examination showed that the palate on the left side was lower than on the right, and on posterior rhinoscopy

a bluish-red growth was seen to involve the left pharyngeal wall and soft palate. Microscopic examination showed that the growth was a sarcoma.

CASE 2.—Male, aged twenty-one, had nasal obstruction on the left side for one year. Later the right side became affected. There was, however, no spontaneous bleeding and no pain. Examination showed a bluish-red tumour of irregular shape projecting into the naso-pharynx. A finger-like process projected into the right nasal fossa. Microscopic examination showed the tumour to be an angio-fibroma. Fearing hæmorrhage, Harmon Smith injected monochloracetic acid on four occasions, and remarkably reduced the size of the tumour.

CASE 3.—Male, aged seventeen, complained of nasal obstruction dating from February, 1914. In May he had a severe epistaxis, which necessitated plugging, and two months later he had another. X-ray treatment was tried for seven weeks, but did no good. On examination, H. Smith found a large bluish-white tumour attached to the lateral wall of the naso-pharynx and projecting into the right nasal cavity. In October Smith removed the greater part of the growth by means of a heavy wire snare. Considerable hæmorrhage followed, necessitating a post-nasal plug. Some days after removal of the plug the patient developed otitis media, which went on to mastoiditis. Other ear complications also followed, which came near proving fatal to the patient. By the time the patient had recovered from his ear troubles the tumour had almost entirely returned. Accordingly H. Smith injected 5 minims of saturated solution of monochloracetic acid, and repeated it at intervals of ten days. The growth has shown material diminution. *J. S. Fraser.*

Fletcher, J. R.—The Standard Tonsillectomy. "Annals of Otology," xxiv, p. 591.

The author advocates dissection and wire snare, and emphasised the following points: (1) Save all the membrane possible. (2) Make the incision entirely around the tonsil. (3) Employ sharp dissection rather than force. (4) Beware of the posterior pillar. (5) Remember that the snare is not an innocent instrument that cuts where it should. (6) Most important, see all that is done. *Macleod Yearsley.*

NOSE.

Cocks, Gerhard H.—An Improved Glatzel Mirror. "Laryngoscope," 1915, p. 135.

Cocks illustrates his paper with diagrams showing the method of use of his mirror and the figures obtained in certain conditions of the nose, such as deflection of the septum, etc. The patient is instructed to keep his mouth tightly closed and to breathe quietly through the nose. The plate is taken from the water bath, dried with a towel, and held below the nose. After thirty seconds the examiner traces the outlines of the moisture deposited on the metal plate, using a pencil made of tailors' bees-wax. The tracing must be made exactly at the end of inspiration. The form and size of the deposit are influenced by the temperature and humidity of the expired air, changes in the air-passages, the temperature of the room, the position in which the plate is held, and, lastly, the temperature of the plate. The air capacity of the lungs also influences

the amount of expired air, differences being noted in the patterns produced by children, females, and males. *J. S. Fraser.*

Sermani, B. P.—**Prophylactic Vaccination against Hay Fever.** "Lancet," February 12, 1916.

The author gives results of vaccination or active immunisation with extract of pollen in 48 cases. These results are as follows: (1) Of 14 patients treated prophylactically, 6 were completely cured, 6 felt very little of their former sufferings, and 2 received but little benefit. (2) Of 12 patients treated only phylactically, 4 were completely cured, 3 felt more or less relief, 5 felt no relief at all. (3) Of 19 patients treated prophylactically by other physicians, all found much relief, whilst of 3 treated therapeutically all found relief. The writer advises a slow increase of dosage. *Macleod Yearsley.*

Cavanaugh, J. A.—**The Inferior Turbinate.** "Annals of Otology," xxiv, 621.

The author does not think the inferior turbinates have received the recognition they deserve. He considers that there are only three types of turbinates which require attention (excluding tumours). They are the intumescent, hypertrophic mucous, and hypertrophic osseous. He pleads for treatment which shall be *conservative of function*, and insists that the septum should always be our point of attack, if by so doing a turbinate can be preserved and our purpose accomplished. The galvano-cautery is evidently viewed by him with suspicion (and rightly so). *Macleod Yearsley.*

LARYNX.

New, Gordon B.—**Prolapse of the Ventricle of the Larynx.** "Laryngoscope," 1915, p. 145.

New records two cases of prolapse of the laryngeal ventricle which have recently been examined in the Mayo clinique.

CASE 1.—Male, aged seventy-one, had suffered from cough for three years with gradual onset of hoarseness, which had been much worse for six months. There was no pain or dyspnoea. Examination showed chronic bronchitis, and a radiogram revealed considerable bronchial thickening. Laryngoscopy showed a smooth globular tumour, with a broad base, which emerged from under the anterior two-thirds of the right false cord and hung down into the glottis. There was no paralysis of the vocal cords, but the tumour prevented their approximation. The larynx was otherwise normal. The tumour was easily indented with a probe, and could be readily tucked back into the ventricle. The patient refused operation.

CASE 2.—Male, aged fifty-nine, had complained of hoarseness and cough for six months. He was unable to speak above a whisper and suffered from dyspnoea. On examination a smooth, greyish-pink, rounded tumour was seen emerging from the anterior half of the right false cord, lying on the true cord and hanging into the glottis. On replacing the tumour the voice at once became clear, but on coughing it came down again. Operation: The tumour was gripped by Bruening's forceps and a wire snare was slipped over it. The tumour was removed close to

its base and the patient's voice immediately restored to normal. Microscopic examination showed normal mucous membrane. New remarks that in these cases a history of much coughing is usually elicited. Koschier says that these tumours are solid or cystic, and that they are due to œdema, chronic inflammation, or to the formation of retention cysts in the mucous glands of the region. They are usually found in the anterior third of the larynx, but may extend the whole length of the ventricle. They may even be bilateral.

J. S. Fraser.

REVIEW.

Diseases of the Nose and Throat. By STCLAIR THOMSON. Second edition. Pp. xvi + 858. Illustrated. Cassell & Co., Ltd, 1916. 25s. net.

Only four years have elapsed since the first edition of this text-book was published, nevertheless much revision of the text has been required by the progress of the specialty, and the description of suspension laryngoscopy forms an entirely fresh portion. Other sections which have newly-introduced matter are those dealing with intra-nasal dacryocystotomy and the nasal route in operating on pituitary tumours.

The chapter on the removal of the tonsils has been entirely rewritten; richly illustrated, it is one of the best sections in the volume, and deserving of very high praise. The author still prefers tonsillotomy "if the symptoms are only those of obstruction to respiration, and is the preferable method for professional singers." We confess that we find the first of these conditions somewhat vague, and as regards the second, no reasons are advanced to support the statement, though to us it seems a question of skill in removing tonsils completely without injuring the palatal pillars. The illustrations of the technique in removing the tonsils are particularly excellent, but would have been more complete if mention had been made of the tonsillectomes of the Ballenger patterns as a substitute for the older patterns. The method of arresting hæmorrhage after tonsil operations by sewing a gauze pledget between the pillars is well shown and described, and reference is made to the simpler and quicker method of using the tonsillar hemostat forceps, which are illustrated, though without the inventor's name.

Not the least valuable portion of the work is the chapter on "Some Operations," comprising Rouge's operation, lateral rhinotomy, nasal route to pituitary tumours, intra-nasal dacryocystotomy, intubation, etc.

We can cordially reiterate the warm commendations with which we welcomed the appearance of the first edition of this work by a distinguished British laryngologist.

P. Watson-Williams.

OBITUARY.

DR. H. M. FITZGERALD POWELL.

WE regret to report the death, in April last, of H. M. Fitzgerald Powell, M.D.St. Andrews, and F.R.C.S.Ed., one of the senior laryngologists of London, and a frequent speaker at the meetings of the Laryngological and Otological Sections of the Royal Society of Medicine.

Dr. Powell was born in Co. Sligo, and was the son of the Rev. Edward Powell. He was educated at Hurstpierpoint College, amongst his contemporaries being R. A. Bennett, the present Editor of *Truth*, also Sir J. Steevens, K.C.B. Later he studied medicine at Glasgow and Edinburgh, and held the posts of House Surgeon and Resident Physician at the Royal Infirmary, Glasgow. After voyages to China, Australia, etc., as a ship surgeon, during which he acquired much experience of malaria and syphilis as seen in the tropics, he began practice at Connaught Square, London, W.

Dr. Powell began his work in Throat and Ear Disease in 1892 at the Throat Hospital, Golden Square, London. He was appointed a member of the Staff in 1898, and worked unweariedly there till a few days before his death. Owing to his kindly manner, his good humour, and the interest he took in them, he was highly esteemed and popular with his patients, the students, and the nursing staff. He was more of a speaker than a writer on the subjects of his specialty. Amongst his papers we mention one on "Some Affections of the Larynx, with Especial Reference to Loss of Voice," *Med. Press Circ.*, 1911, and one on the "Treatment of Mastoiditis," *Polyclinic*, 1911.

For some years Dr. Powell had suffered from attacks of laryngitis, bronchitis, and dyspepsia. An operation done last year tried him much, and though never well afterwards he continued to work till a few days before the end of his busy and useful life.

He leaves a widow and one son.

J. W. B.

NOTES AND QUERIES.

It is with pleasure and great pride that we insert the following extract from "Nelson's History of the War," by John Buchan, vol. vii, p. 35. It appears in the chapter dealing with the second battle of Ypres:

"Every day of the fighting we had got in our wounded under cover of night, and in the cellars of Zonnebeke village operations had been performed by candle-light. That evening" (May 3, 1915) "the wounded were evacuated, all but a small number of very bad cases whom it was impossible to move, and who were left behind in charge of two orderlies. The Royal Army Medical Corps have never done more brilliant work in all their brilliant history. Under the guidance of Col. Ferguson, assisted by Major Waggett (the well-known London specialist in throat diseases) the cases were brought from the cellars and dug-outs, and silently and swiftly carried along the dark roads beyond the fire zone. The difficulty of such a withdrawal may be realised from the fact that at some places, such as Grafenstafel and Broodseinde, the Germans were within ten yards of our line. Not less than 780 wounded were removed from our front. . . . Not a single man was lost."

The following advertisement appeared in the *British Medical Journal*, June 3, 1916:

"Advertiser desires Name and present Address of Doctor practising in Southampton in 1899, who successfully performed an operation there for Cancerous Growth in Throat on Mr. FRED ALSOP in that year.—Address, "Colombo," No. 2102, *British Medical Journal* Office, 429, Strand, W.C."

BOOK RECEIVED.

The Mortality from Cancer throughout the World. By Frederick L. Hoffman, LL.D., F.S.S., F.A.S.A. Newark, New Jersey: The Prudential Press, 1915.



FIG. 1.—Case 2. The subglottic cicatricial band seen by suspension laryngoscopy.



FIG. 2.—Case 2. The subglottic cicatricial band seen through a small bronchoscope passed down below the vocal cords.



FIG. 3.—Case 3. *a*, Epiglottis. *b*, Right vocal cord. *c*, Hypopharynx. *d*, Subglottic fibrous stenosis. *e*, Cricoid cartilage. *f*, Tracheotomy wound. *g*, Trachea.

TO ILLUSTRATE DR. A. LOGAN TURNER'S ARTICLE ON STENOSIS OF THE LARYNX
IN CHILDREN FOLLOWING INTUBATION AND TRACHEOTOMY.

THE
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**REPORTS FOR THE YEAR 1915 FROM THE EAR AND THROAT
DEPARTMENT OF THE ROYAL INFIRMARY, EDINBURGH.**

Under the care of A. LOGAN TURNER, M.D., F.R.C.S.E., F.R.S.E.

PART III.

**STENOSIS OF THE LARYNX IN CHILDREN FOLLOWING
INTUBATION AND TRACHEOTOMY.**

BY A. LOGAN TURNER, M.D., F.R.C.S.E., F.R.S.E.

It is not my intention to discuss and illustrate the various affections of the larynx in children which may produce a more or less chronic obstruction in that organ. During the last ten years we have had to deal with cases of congenital laryngeal syphilis, laryngeal lupus, and papillomata of the larynx, causing a varying degree of chronic respiratory difficulty. In the same period, however, we have met with an entirely different class of case which, both from the point of view of aetiology and of treatment, makes it of special interest to the laryngologist. I refer to partial and complete stenosis of the larynx following intubation, intubation and tracheotomy, or tracheotomy alone. In the cases under consideration the necessity of interference by one or other of these procedures has been due to an acute inflammatory condition of the larynx of diphtheritic or other origin. The purpose of this paper is to investigate as far as is possible the part played by the primary

affection and by the surgical procedure adopted for the relief of the acute obstruction in the causation of the subsequent atresia, and to describe the changes observed in the larynx. Such cases are not only of great interest to the surgeon in the immediate bearing which they have upon the question of intubation and tracheotomy, but they are also a source of great anxiety to him and to the patient's relatives on account of the serious difficulties which may arise in connection with the re-establishment of the natural air-passage.

I wish to acknowledge my great indebtedness to Dr. Claude B. Ker, the Medical Superintendent of the City Hospital for Infectious Diseases, Edinburgh, for the opportunity which he has kindly given me for the study of the cases of laryngeal obstruction following intubation and tracheotomy. I must also express my thanks to him for the notes which he has supplied, and for the assistance which he has given me upon a number of points connected with the treatment of the children while under his care.

It is convenient to group the cases according to the surgical procedures that were adopted for the relief of the acute laryngeal obstruction. We thus have three classes :

Group A.—Intubation only (two cases).

Group B.—Intubation and Tracheotomy (three cases).

Group C.—Tracheotomy only (two cases).

We propose to deal with the first two groups together, as intubation was carried out in both of them.

GROUP A.

(*Intubation.*)

CASE 1.—*Laryngeal Diphtheria—Acute obstruction of larynx—Intubation—Partial atresia of larynx.*

S. J.—, female, aged two years and a half, was admitted into the City Hospital suffering from diphtheria on September 27, 1913. Intubation was at once performed. As the tube was retained with difficulty, frequent re-intubation had to be carried out. The tube was inserted on ten different occasions, the period of time covered by the intubation being nine weeks. The child was finally discharged from the hospital on December 15th, having been kept under observation for a fortnight after the final removal of the intubation tube. She had apparently made a complete recovery, the respiration being normal at the time of dismissal.

The child was admitted to the Royal Hospital for Sick Children on January 15, 1914, one month after leaving the City Hospital, on account of stridorous breathing and occasionally a croupy cough. I am much indebted to Dr. John Thomson and Dr. W. G. Porter for the following notes, and for their kind permission to publish the case. The patient, after returning home from the Fever Hospital, had had considerable difficulty in breathing, more marked at night, and frequently inter-

fering with sleep. On admission she looked pale, and there was a trace of cyanosis about the lips. There was marked inspiratory stridor with indrawing of the epigastrium and lower ribs. A slightly croupy cough was noticeable; there was some evidence of rickets; no enlarged glands could be felt.

Respirations were 46; pulse, 136; temperature, 99.6° F. The chest percussion note was resonant throughout, the breath sounds harsh and vesicular, with the expiration prolonged. There were no accompaniments. The abdomen was normal. The tonsils were slightly enlarged, but no adenoids were found. Von Pirquet's reaction was negative. No history of syphilis or tubercle was obtainable, and the child had apparently been healthy until her attack of diphtheria.

On account of the laryngeal obstruction Dr. W. G. Porter arranged for an examination of the larynx by "suspension laryngoscopy." After a preliminary injection of $\frac{1}{100}$ gr. of atropin, the child was anæsthetised with equal parts of chloroform and ether and placed in the suspension position. Dr. Porter informs me that immediately upon the introduction of the tongue spatula respiration ceased. The spatula was at once removed, and artificial respiration commenced, without, however, obtaining the desired effect. Tracheotomy was rapidly performed, and artificial respiration again resorted to, but without success.

As permission was only granted for the removal of the larynx, a complete *post-mortem* could not be carried out.

The Larynx.—The epiglottis presents an irregular thickened appearance upon its anterior surface and free border upon the left side, the outline of the right half having a normal contour. Projecting from the right ventricle throughout its whole length there is granulation tissue: the right vocal cord has a somewhat uneven outline and beneath it the mucous membrane is œdematous. The corresponding region on the right side of the larynx is normal in appearance. The mucous membrane covering the cricoid region is normal, there being no sign of scar or cicatricial band.

CASE 2.—*Laryngeal diphtheria—Acute obstruction of larynx—Intubation—Incomplete stenosis of larynx.*

M. M—, female, aged three, was admitted to Colinton Mains Hospital on March 5, 1915, suffering from diphtheria with laryngeal obstruction. Intubation was performed on admission. The tube was well borne and was not coughed up. On removal of the tube for the purpose of cleaning, the breathing was found to be obstructed, necessitating its re-introduction. It was not until the end of twenty-one days that the tube could be permanently removed, intubation having been carried out seven times during that period. The child remained in hospital from three to four weeks after the final removal of the tube, the respiration during that time being comfortable, so that tracheotomy was not required.

She was brought to the Ear and Throat Department on December 10, 1915, seven months later, on account of some difficulty of breathing, choking at night, and a good deal of troublesome cough. The child appeared to be in good health: her colour was normal: vocalisation was clear. Examination revealed the presence of adenoids. Owing to an attack of chicken-pox followed shortly afterwards by pneumonia, the examination of the larynx was delayed until March 11, 1916, at which date she was admitted for this purpose, that is to say one year after her attack of diphtheria.

During the child's short stay in hospital respiration was for the most part natural and noiseless, save when she became excited, occasionally also when she was asleep a slight stridorous sound was detected. Suspension laryngoscopy was carried out under general anæsthesia. The upper aperture of the larynx presented a perfectly normal appearance, and the false and true cords were of natural colour

and outline, the latter moving slightly in respiration. A narrowing of the subglottic region was visible through the glottic chink (Fig. 1), but in order to determine more accurately the exact condition a small bronchoscopic tube was introduced. The vocal cords readily separated to admit it. In the region of the cricoid cartilage a cicatricial band was observed placed anteriorly and passing laterally, but apparently absent posteriorly. It presented a sickle-shaped free margin, being both broader and thicker anteriorly and tending to narrow on each side (Fig. 2). Probably rather less than half of the lumen of the respiratory tube was occupied by the fibrous band. Two or three rings of the trachea were visible beneath it. No attempt was made to pass the bronchoscope through the stricture, so that the vertical extent of the obstruction was not ascertained.

GROUP B.

(Intubation and Tracheotomy.)

CASE 3.—*Acute laryngeal obstruction—Intubation—Tracheotomy—Laryngeal stenosis and inability to remove the tracheotomy tube.*

R. W—, male, aged three years and a quarter, was admitted to the Colinton Mains Fever Hospital under Dr. Claude B. Ker on May 30, 1910. The child was sent into hospital as a case of diphtheria, with a history of sore throat, vomiting shivering and croupy breathing lasting for two days. No membrane could be detected on the fauces or pharynx, but the obstructed character of the breathing made intubation necessary upon the evening of admission. Successive swabs taken from the throat were invariably negative, so that no positive evidence of diphtheria was obtained in this case.

On June 3, and again on June 5, the intubation tube was removed, but on each occasion it was found necessary to replace it on account of the obstructed character of the respiration. On June 7 and 8 the tube was coughed out and difficulty was experienced in replacing it. On the latter date, therefore, tracheotomy was performed. After an interval of time, the tracheotomy cannula was removed, but reinsertion became at once necessary owing to severe dyspnoea. A similar difficulty arose on each occasion, thus preventing its permanent removal. During the tracheotomy period more than one attempt was made to re-intubate, but while the tube entered the upper aperture of the larynx, it was found impossible to pass it beyond the level of the vocal cords.

The child was transferred on July 19 to the Ear and Throat Department, Royal Infirmary, for further examination. Interrogation of the boy's father elicited the fact that about eighteen months before, the child had some difficulty in breathing, having a tendency to gasp for breath. Attacks of this nature occurred also when he cried.

Under chloroform the larynx was examined by direct laryngoscopy. There was no evidence of papilloma. The upper aperture of the larynx was normal. The false and true cords presented no change. The true cords, however, were closely approximated. A probe could not be passed below the glottic chink. Examination of the subglottic region through the tracheotomy wound revealed an apparently impermeable obstruction.

On October 3 the child was readmitted to hospital. There had been a good deal of difficulty with the tracheotomy tube in the interval. The breathing had been occasionally interfered with, producing cyanosis. On October 13 chloroform was again administered, the tracheotomy tube was removed, the wound in the trachea enlarged downwards, and its lumen inspected as far as the bifurcation. No obstruction was detected below the tube, but above it the channel appeared to

be completely blocked. The tracheotomy tube was re-inserted. On the night of October 14 the breathing became very obstructed, with marked cyanosis, and the child died suddenly.

Permission for a complete *post-mortem* examination was not obtained, but leave was given to remove the larynx.

The following is a description of the larynx and trachea, a drawing of which is represented in Fig. 3. The epiglottis, ary-epiglottic folds, arytenoids, and false cords are normal in appearance and outline, and there is no evidence of any recent or previous inflammatory or ulcerated condition. The vocal cords are white and smooth, and lie close together in the position of adduction. A vertical antero-posterior section was made in the sagittal plane. From the level of the vocal cords down to the tracheotomy wound no trace of any lumen can be detected, the whole of this area being filled with a dense white fibrous-like material, converting the pre-existing tube into a solid column. The trachea from the tracheotomy wound down to the bifurcation is filled with dark-coloured thick secretion, while the underlying mucosa is inflamed and thickened.

A portion of the fibrous tissue was removed from the subglottic region for microscopic examination. It was found to consist of fibrous tissue undergoing myxomatous change, and showing marked lymphocytic infiltration. The blood-vessels presented evidence of very considerable proliferative endarteritis, suggestive of a syphilitic origin of the chronic inflammatory process.

CASE 4.—*Acute laryngeal obstruction — Intubation — Tracheotomy—Laryngeal stenosis with inability to remove the tracheotomy tube*

A. M'V—, male, aged three, was admitted to Colinton Mains Hospital on February 8, 1911, with acute laryngeal obstruction. No false membrane was detected either then or later upon the fauces and pharynx, and cultures made from the throat never gave any growth of diphtheria bacilli, so that no positive diagnosis of this disease was made.

Immediate intubation was necessary, and great difficulty was experienced in carrying it out, as subglottic œdema appeared to exist; the tube, however, was placed in position, and the respiratory difficulty was relieved. The tube was removed on February 12, but owing to the embarrassed breathing was re-inserted. On February 14 it was again extracted, but on account of the respiratory difficulty tracheotomy was performed. At the operation a small quantity of pus escaped through the wound, but its exact origin was not ascertained. As it was found impossible to dispense with the cannula on account of the continued laryngeal obstruction, the child was sent to the Ear and Throat Department for further examination on March 21, six weeks after the first intubation.

Examination of the tracheotomy wound showed the existence of tough, almost fibrous granulation tissue immediately above the position of the tube, and when this was *in situ* a granulation projected through the aperture in the convexity of the cannula. Under general anaesthesia direct laryngoscopy was carried out. The upper aperture of the larynx was normal in appearance, and the false and true cords showed no change. The subglottic region was obviously obstructed, as the bronchoscope came against granulation tissue, and the tracheotomy tube could not be seen through it. When thyrotomy was performed three weeks later, this observation was confirmed, granulations and fibrous tissue being found between the cricoid cartilage and the plane of the tracheotomy wound.

CASE 5.—*Laryngeal diphtheria—Acute obstruction of larynx—Intubation—Tracheotomy—Stenosis of the larynx and inability to remove the tracheotomy tube.*

E. W—, female, aged one year and nine months, was admitted to Colinton Mains Hospital on November 24, 1914, suffering from faucial and laryngeal

diphtheria. Owing to the obstructed breathing she was at once intubated. The tube was coughed up three times on the day of admission. Re-intubation was carried out on each occasion without difficulty.

An attempt to remove the tube finally was made on December 7, but as respiration was still obstructed, it was again inserted two hours later. On December 14 it was thought better to perform tracheotomy. The duration of the intubation period in this case was twenty days, intubation being carried out on eight different occasions during that time. The child remained in the Fever Hospital wearing the tracheotomy tube until April 28, 1915. During this period several attempts were made to dispense with it, but on each occasion its re-introduction was necessary. The child's general health being now excellent, she was recommended to the Ear and Throat Department, Royal Infirmary, for further examination, five months after the first intubation.

On April 30, 1915, a general anæsthetic was administered and the larynx was examined by "suspension laryngoscopy." The upper aperture and the interior of the larynx down to and including the vocal cords presented a perfectly normal appearance. Below the level of the vocal cords, however, the lumen was obstructed, so that the tracheotomy tube was invisible. A small-sized bronchoscopic tube was passed down through the glottis, and the region thus exposed presented a pink, vascular appearance which suggested the presence of granulation tissue.

On May 12 a general anæsthetic was again administered and a vertical incision was made over the thyroid cartilage downwards to the tracheotomy wound. The lower third of the thyroid cartilage, the cricoid region and the upper rings of the trachea were divided mesially and the interior of the canal thus exposed was inspected. The mucous membrane presented a perfectly normal appearance from the vocal cords downwards to the tracheotomy tube. There was an entire absence of granulation tissue or any fibrous stenosis. More careful examination revealed the fact that the cricoid cartilage was absent at any rate the anterior and lateral portions of the cartilaginous ring. It was thus evident that the obstruction to respiration through the natural channel was due to collapse of the walls of the canal and not to the presence of granulations as had been suggested by the appearance observed during the suspension examination. The soft parts were sutured and the tracheotomy tube left *in situ* pending further consideration as to the best method of procedure.

THE PRIMARY LARYNGEAL DISEASE.

The subject which these cases illustrate—stenosis of the larynx after tubage—has received considerable attention from a number of writers. Discussion has taken place as to the relative importance to be attached to the part played by the primary disease on the one hand and by the method of surgical intervention on the other, in the production of the subsequent stenosis. It is obviously difficult to determine this point with any degree of accuracy. In certain acute affections of the larynx severe inflammatory changes may occur of such a nature as in themselves to produce subsequent atresia or actual stenosis. Amongst these we may cite diphtheria and the laryngeal complications of typhoid fever. In

both there is the tendency to a necrotic process; intense œdema, ulceration, perichondritis and abscess formation, even causing necrosis of cartilage, may lead to marked narrowing of the airway and to cicatricial changes causing permanent obstruction. It is just in this class of case, however, that intubation or tracheotomy is a necessary procedure, and the super-added pressure of an intubation tube may be the determining factor in the production of the stenosis. Cases of laryngeal diphtheria not requiring surgical intervention, but nevertheless followed by stenosis, occur but are very rare. Collinet has reported their occurrence. Ker, in a large experience at the Edinburgh Fever Hospital, has not met with such cases.

While diphtheria, both from its frequency and from the intensity of the inflammation, must necessarily furnish the majority of the cases which we are considering, it is interesting to study the following figures. An analysis of the five cases, above detailed, shows that three were diphtheria and two suffered from an acute laryngitis of unknown origin. Boulay has reported nine cases of stenosis in which intubation was performed; four were diphtheritic, five were not. Bokai reports eight cases, five diphtheria, three non-diphtheritic. Rabot, Sargnon and Barlatier eight cases, of which only four were diphtheria. Further, these authors were asked to operate upon four cases for the relief of stenosis, and of these only two were of diphtheritic origin; the third was a case of laryngitis complicating measles, while the fourth was a case of membranous streptococcal laryngitis. Of the total 34 cases here enumerated, 18, or 52 per cent., were diphtheria, and 16, or 47 per cent., were cases of laryngitis of other origin. Medical literature contains numerous records of single cases and groups of cases of post-diphtheric laryngeal stenosis, so that too much importance must not be attached to the percentage figures obtained from a small total of 34 cases. The interest of the figures lies mainly in the fact that cases of non-diphtheritic laryngitis requiring intubation may also develop subsequent stenosis.

Of the non-diphtheritic forms of acute laryngitis which may predispose the larynx to stenosis, mention must be made of the acute subglottic laryngitis of children, and laryngitis complicating the infectious diseases, more particularly measles. Donaldson has reported a case of subglottic stenosis consecutive to acute laryngitis, and Neumann a similar case, in neither of which intubation was practised. While certain acute laryngeal affections may be followed by stenosis, such cases are rare, and we must therefore

regard the surgical intervention for the relief of the acute obstruction as the determining factor in the production of the subsequent narrowing of the laryngeal lumen. The inflamed and œdematous mucous membrane is naturally vulnerable, and the pressure of an intubation tube upon it must necessarily be a cause of further irritation.

INTUBATION.

When the statistics which are available are considered, we must confess to a feeling of surprise that these cases do not occur more frequently than they apparently do. Ker has kindly furnished me with the following figures from his records at the Fever Hospital. He has taken the period of ten years from 1906-1915 inclusive, during which time 268 intubations were performed for acute laryngeal obstruction mainly, though not entirely, in cases of diphtheria.

So far as we have been able to ascertain only five of the cases, or 1 per cent., subsequently developed stenosis of the larynx. The cases are those here recorded. In the light of the fact that two of them (Group A) left the fever hospital without any sign of embarrassed respiration, it is of course possible that one or more may have been discharged apparently cured and thus have escaped observation, but we are of opinion that this is not probable. The following table is prepared from such statistics as we have been able to obtain:

TABLE I.

Author.	Cases intubated.	Subsequent stenosis.	Percentage.
Ker	268	5	1.8 per cent.
Von Wiederhofer	694	7	1.0 „
Ganghofner	1000	3	0.3 „
Variot	500	3	0.6 „
Galatti	31	2	6.0 „
Bokai	1203	4	0.3 „
Marfan	1600	2	0.1 „
Rabot, Barlatier and Sargnon	1200	8	0.6 „

It is evident from a study of these figures that stenosis of the larynx following intubation must be regarded as a rare complication, and that its occasional occurrence in the hands of the expert

operator should not deter him from practising so valuable a procedure.

In considering the part played by the intubation tube in the production of stenosis, it is necessary to briefly note in the first instance that damage may be caused by faulty manipulation in the hands of the inexperienced; even the most competent operators, however, may injure the walls of the larynx in cases where intubation proves particularly difficult. The injury which the inexperienced operator may produce affects, as a rule, the upper aperture of the larynx and the structures above the rima glottidis. The epiglottis and the ary-epiglottidean folds may be torn and the false and true cords and the ventricle of Morgagni excoriated. Occasionally a false passage has been made through the cricothyroid membrane. Proof of this has been demonstrated by Variot and Bayeux upon the cadaver of a young child on which experimental intubation was carried out by a person with no experience. Severe injuries of this kind would naturally be followed in the living by cicatricial stenosis, in which case the operator and not the intubation must be to blame.

Turning from the question of traumatism, however, we come to the main point of our thesis, namely, the influence of tube upon the larynx in the hands of the experienced operator. Ulceration of the mucous membrane may develop consequent upon the pressure of the intubation tube. The degree of ulceration will vary considerably, and it by no means follows that if an ulcer is formed it will necessarily lead to cicatricial stenosis. If superficial, cure will take place without producing any permanent damage; on the other hand, if the ulceration extends deeply, subsequent changes will lead to cicatricial contraction. As a rule, the laryngeal mucosa affected with diphtheria tolerates the pressure of the tube, and different opinions have been expressed as to the frequency with which ulceration takes place in intubation cases. From a study of the figures which we have already given in the table dealing with post-operative stenosis, it is evident that the severe forms of ulceration can only rarely occur.

The ulcer or ulcers thus produced may be said to have their seat of election in the region of the cartilaginous cricoid ring. It has been described as the decubitus ulcer. The subglottic region, especially the portion within the cricoid cartilage, is predisposed, on anatomical grounds, to ulceration from the pressure of an intubation tube lying in contact with the inflamed mucosa. Here the larynx is narrow, and is completely surrounded by a firm carti-

laminous ring, which makes the wall unyielding. The mucous membrane in this situation can be somewhat readily detached from the deeper structures owing to a considerable development of the cellular tissue beneath it, consequently the production of œdema is rendered more easy.

Other factors must also be taken into consideration as influencing the formation of the decubitus ulcer. These are, the age of the patient, the frequency of re-intubation and its duration, and lastly the form of the intubation tube that is used.

AGE OF THE PATIENT.

Statistics make it evident that ulceration occurs more frequently in young children. Although the cases intubated in our series were only five in number, all were under four years of age, one being in the second year of life, three in the third, and one in the fourth year. In a series of twenty-one cases collected by Bokai, the majority, thirteen in number, occurred before the age of four, the remaining eight being in the fifth and sixth years of life.

THE FREQUENCY OF INTUBATION AND ITS DURATION.

These must be regarded as the most important factors in the production of the decubitus ulcer, and of the two the duration has the more significance. It is essential, therefore, to analyse these two points from the facts at our disposal. The usual practice of those who are in the habit of intubating probably varies somewhat. As the cases of stenosis now under consideration occurred in the Edinburgh Fever Hospital, I cannot do better than quote from Ker's "Textbook of Infectious Diseases," published in 1909, as to the routine adopted in that hospital. The author says: "The psychological moment for removing the tube (intubation) is from two and a half to three days from its insertion, and, always provided the temperature and respiration are normal, there is then a fair chance that the patient will escape further manipulation. If, however, there is still pyrexia and the breathing is rapid, the tube will often have to be replaced, sometimes in a few minutes, sometimes after a couple of hours. It is rare for a patient who has breathed satisfactorily for as long as four hours to require a second intubation. Should, however, the tube be re-inserted, an attempt should be made to remove it every second day. The greatest number of re-intubations which I have performed in any one case

is fourteen, and the patient in question, after wearing a tube for four weeks, recovered satisfactorily, with no sign of ulceration of the larynx." Other authorities consider the fifth or sixth day as a maximum, and the most appropriate time for extubation.

The five recorded cases of intubation followed by ulceration and stenosis have occurred since the above quotation was published, and an analysis will show that in four the duration of the intubation period was shorter than in the case quoted by Ker, and in the fifth the period was considerably longer. In none of the cases, however, did the number of intubations exceed ten. The following table will show at a glance the points under consideration :

TABLE II.—*Cases of Ulceration and Stenosis following Intubation (Ker).*

	Case.	No. of intubations.	Duration of intubations.
Group A.	{ 1 . . .	10 .	9 weeks
(Intubation only)	{ 2 . . .	7 .	3 „
Group B.	{ 3 . . .	5 .	9 days
(Intubation and	{ 4 . . .	2 .	6 „
Tracheotomy)	{ 5 . . .	8 .	3 weeks.

In order to supplement these figures an analysis has been made of the data provided by a study of eight cases of subglottic laryngeal stenosis which have been operated upon by Rabot, Sargnon and Barlatier for the relief of the obstruction. All were children; three had had diphtheria, two acute laryngitis complicating measles, one acute laryngitis following scarlet fever, while two had laryngitis of unknown origin. After extubation, tracheotomy had been necessary. The following table epitomises the points under discussion :

TABLE III.

Case.	No. of intubations.	Duration of intubation.
1 . . .	5 . . .	24 hours
2 . . .	5 . . .	15 days
3 . . .	6 . . .	15 „
4 . . .	2 . . .	10 „
5 . . .	5 . . .	14 „
6 . . .	4 . . .	9 „
7 . . .	10 or 12 . . .	3 weeks
8 . . .	5 . . .	3 „

The figures in the two tables are striking, as they demonstrate the great variations met with both in the number of intubations performed and in the length of the period in which tubes were worn. On the one hand we find subglottic stenosis ensuing after twenty-four hours' intubation (Case 1, Table III) and on the other hand we have normal respiration embarrassed though not necessitating tracheotomy after intubation extending over a period of nine weeks (Case 1, Group A, Table II).

The average duration of the intubation period in the thirteen cases contained in Tables II and III is 17 days, and the average number of intubations performed is five. The explanation of the great variations observed in the figures in these two tables is probably to be sought for in the degree of virulence of the primary laryngeal inflammation.

THE INTUBATION TUBE.

It is necessary to refer to the intubation tube as a factor requiring consideration. Ker uses in his cases the perfected O'Dwyer pattern in vulcanite, but occasionally alternates it with the Bayeux metallic tube. On the other hand the Lyons school appear to use almost exclusively the metallic tube. The material of which the tube is made is a matter of importance, and the vulcanite, though not universally used, would appear to be most in favour, on account of its lightness, being less liable to injure the mucous membrane.

SECONDARY TRACHEOTOMY.

It is necessary to consider briefly whether tracheotomy assists in the production of the subglottic changes leading to stenosis. In the majority of the cases of obstruction following intubation, tracheotomy has been found necessary in order to save the patient from further respiratory difficulty. In the two cases in Group A of our series this was not required. It is obvious from the clinical history of the cases here reported that prior to opening the trachea the changes which led to the more or less complete occlusion of the larynx were already present, otherwise secondary tracheotomy would not have been required. It is doubtful, therefore, if the cannula can be held responsible for any very active share in the production of the stenosis. It is possible, however, that the prolonged use of the tracheotomy cannula may assist in consolidating the changes already present, and by stimulating the development of granulation tissue increase the area of cicatricial stenosis.

PATHOLOGICAL CHANGES FOUND IN THE LARYNX.

Reference has already been made to the cricoid region as the seat of election for the pathological changes which occur, and the explanation of this has been shown to be mainly of an anatomical character. The clinical method of investigation has been greatly facilitated in recent years by the introduction of Killian's direct laryngoscopy and by the use of his suspension apparatus. Prior to this the means at the disposal of the laryngologist were very inefficient, as the indirect method of laryngoscopy in young children, even under a general anæsthetic, rarely led to any satisfactory observations, and the examination of the subglottic region from the tracheotomy wound presented difficulties. It was necessary to perform laryngo-fissure in order to obtain the desired knowledge. With one exception all the cases in our series were examined in the first instance by the direct method.

In four of the five cases which were intubated, the obstruction was subglottic. In the fifth, the condition which was found was quite unlike that presented by the other cases. The changes in it were almost entirely in the upper part of the larynx. The anterior surface and the free border of the epiglottis on the left side were irregularly thickened; granulation tissue projected from the right ventricle throughout its whole length, and the right vocal cord had an uneven outline, while beneath the cord the mucous membrane was œdematous. The child, Case 1, Group A, had been intubated ten times during a period of nine weeks. The pathological changes in the upper part of the larynx associated with the prolonged and frequent re-intubations were more suggestive of those produced by trauma, but they were not inconsistent with the long duration of the tube.

In the remaining four cases, the lesion was subglottic and in the cricoid region. Case 2, Group A, a case of diphtheria, in which a secondary tracheotomy had not been required, was examined by the direct method one year after the primary illness. In the cricoid area a well-formed cicatricial band was observed placed anteriorly and laterally, but apparently absent posteriorly. It presented a sickle-shaped free margin, the band being both broader and thicker in front, but tapering on each side (Fig. 2). Rather less than half the lumen of the respiratory tube was thus occluded, and two or three rings of the trachea were visible beneath it. The vertical extent of the stricture was not ascertained.

In Case 3, Group B, non-diphtheritic, and requiring a secondary

tracheotomy, the larynx was examined *post-mortem*, four and a half months after the original illness. The vocal cords lay close together in the position of adduction. A vertical, sagittal section in the mesial plane through the larynx and upper part of the trachea demonstrated the absence of any lumen between the vocal cords above and the tracheotomy wound below. The whole of this area was filled with a dense, white, fibrous-like material converting the pre-existing lumen into a solid column of tissue (Fig. 3). A portion of the tissue was examined microscopically, and was found to consist of fibrous tissue undergoing myxomatous change, and showing marked lymphocytic infiltration. The blood-vessels showed considerable proliferative endarteritis.

In Case 4, Group B, non-diphtheritic and with secondary tracheotomy, the larynx was examined both by the direct method and by thyrotomy, two months after the acute illness. The cricoid area was occupied partly by granulations and partly by fibrous tissue.

In Case 5, Group B, diphtheria, with secondary tracheotomy, examination of the larynx was made five and a half months after the acute illness. When the bronchoscopic tube was passed through the glottic chink the subglottic area presented a pink, vascular appearance, which suggested the existence of granulation tissue. When the condition was examined through an external incision, however, a normal mucous membrane was found, but the cricoid cartilage, at any rate its anterior and lateral portions, was absent, and the stenosis was the result of collapse of the walls of the respiratory canal.

The pathological changes in the cricoid region consecutive to intubation, as illustrated by Cases 2, 3, 4, and 5, resemble those which have been described by other writers upon the subject. They may be said to represent different stages of the inflammatory and ulcerative process, passing from the granulation tissue stage on the one hand (Case 4) through the fibrous tissue stage, causing incomplete or complete obliteration of the lumen (Cases 2 and 3) to actual destruction of cartilage (Case 5). The formation of a superficial decubitus ulcer is probably a not-infrequent event where intubation tubes are employed. Bokai in 156 autopsies found evidence of such in every case; the ulceration was observed in every case at the cricoid ring and at the level of the first two rings of the trachea—in 145 instances on the anterior wall of the canal, in six on the posterior wall, and in five in both situations. The degree of ulceration varies considerably, and Widerhofer has classified the

ulcers as (a) the simple epithelial desquamation, (b) ulceration denuding the cartilage, and (c) ulceration and necrosis of cartilage. The superficial ulcerations will cure, while those of a more serious nature lead to cicatricial tissue formation with incomplete or complete stenosis of the respiratory lumen.

It is naturally difficult to draw any conclusion as to a relationship between the duration of the intubation period and the evolution of such changes as we have described in the mucous membrane of the larynx and the subjacent tissues. The larynx comes under direct examination at a varying period after the acute illness has passed off. The final changes which have been observed are very similar, whether the intubation period is of short or long duration. In the case described by Rabot, Sargnon and Barlatier, in which the tube had been worn for twenty-four hours, and in which a secondary tracheotomy was required, complete subglottic cicatricial stenosis was found eleven months later. In Case 2, Group A, intubated for three weeks, and not requiring a secondary tracheotomy, a partial fibrous atresia was found one year after the intubation.

GROUP C.

(Tracheotomy.)

The two following cases have been introduced as examples of respiratory difficulty following the removal of the cannula after primary tracheotomy performed for the relief of acute laryngeal obstruction. The difficulty of re-establishing respiration through the natural air-passages after opening the trachea has long been recognised by the surgeon, and medical literature contains many examples. The cases here detailed are not without interest, and I do not propose to do more than record them.

CASE 6.—Laryngeal diphtheria—Acute obstruction of larynx—Tracheotomy—Intermittent obstruction of the larynx after removal of tracheotomy tube.

B. W—, female, aged two years and a half, had diphtheria at the beginning of October, 1913. On account of the marked laryngeal stridor tracheotomy was performed. The tube was worn for six days and then removed, the wound healing in due course. It was soon noticed, however, that the breathing at night was not satisfactory: the professional nurse who remained in attendance complained of the occasional stridorous respiration. During the day respiration as a rule was normal and the child's voice was natural.

On account of the noisy nocturnal breathing I was asked to see the child six weeks after her recovery from diphtheria. She had the appearance of a well-marked case of nasal obstruction; she snored at night; the nurse, however, felt certain that on occasions the noisy respiration was laryngeal in origin and not

ordinary snoring. The tonsils were very large, meeting in the middle line. Though no digital examination of the naso-pharynx was made, the conclusion arrived at was that adenoids were probably present. The child's voice was quite normal, and although she was somewhat upset by the examination of her throat, no inspiratory stridor was detected. The tracheotomy wound was healed.

Arrangements were made for a "suspension laryngoscopy" and for the removal of the tonsils and adenoids in the course of a few days.

Three days later I was informed by telephone that the child was "black in the face" and evidently dying from asphyxia. Shortly after the receipt of this message, information was received that the child had recovered and was breathing quietly as the result of artificial respiration carried out by the nurse. Instructions were given to bring the child at once by motor car into the Nursing Home, where preparations were made for tracheotomy.

When the child was seen at the Home she was breathing quietly and her colour was normal. It was evident from the information obtained from the nurse that there had been serious laryngeal obstruction, and that the patient owed her life to the skill of her attendant, who kept up artificial respiration until normal breathing was re-established.

Under general anaesthesia the old tracheotomy wound was reopened. With the edges of the trachea drawn apart, a careful inspection of the lumen was made. A pinkish, soft, polypus-like growth partly filling the lumen was seen to project downwards into the upper part of the tracheotomy wound. Its attachment was found on the right side of the tracheal wall just below the cricoid cartilage. It was removed with scissors.

A few days later the tonsils and adenoids were removed, the tracheotomy tube was dispensed with, and the child made an uninterrupted recovery, there being no further respiratory difficulty.

CASE 7.—Acute laryngeal obstruction—Tracheotomy—Temporary stenosis with inability to remove the tracheotomy tube for a period of three months.

Baby R—, female, aged one year and a half, under the care of Dr. W. E. Frost, had been ill for two days. The temperature was slightly raised; nothing abnormal could be detected in the chest and abdomen. The fauces and pharynx were red and inflamed, but free from false membrane. During the second day of the illness the child's cry had become slightly husky and the breathing a little noisy. A swab from the throat showed no diphtheria bacilli. She had previously been in good health. On the evening of April 25, 1914, respiration was more difficult and a distinct inspiratory stridor was detected; the face had a greyish pallor and there was a slight retraction in the supra-clavicular regions. The nasal cavities, fauces and pharynx were devoid of false membrane. No attempt was made to examine the larynx. As the difficulty in breathing was evidently increasing, it was deemed advisable to perform tracheotomy at once. There was no evidence of false membrane in the trachea.

After an interval of one week the cannula was removed, but its immediate replacement was necessary, as respiration was at once obstructed, the child becoming livid. After two or three days' interval a second attempt was made to dispense with the tube, but with a similar result. On both occasions the patient was apparently terrified, thus increasing the respiratory difficulty. In order to eliminate the element of fear, possibly due to the presence of the surgeon, the nurse was instructed in the method of removal of the tube and its re-introduction, should this prove necessary. Again the attempt was unsuccessful.

As no examination of the larynx had hitherto been made, and consequently an exact diagnosis had not been arrived at, a general anaesthetic was given and

suspension laryngoscopy carried out. A good view of a perfectly normal larynx was obtained. Examination of the subglottic region through a small bronchoscope tube introduced through the tracheotomy wound revealed nothing abnormal. There was an entire absence of granulation tissue. Under the anæsthetic the child breathed quietly through the larynx when the edges of the tracheotomy wound were held in apposition.

Having satisfied ourselves as to the absence of any pathological condition, we decided to again try to educate the child to dispense with the cannula, and while it became possible to do without the tube for longer periods, its re-insertion from time to time was still necessary. With any undue excitement the respiratory difficulty became as marked as formerly. The child was finally placed under the care of her mother, who was given the necessary instructions as to how to deal with an emergency. It was not until a period of three months had elapsed from the date of the first attempted removal of the cannula that normal respiration was maintained and the tube finally dispensed with.

In conclusion I wish to acknowledge the assistance which I have received from a study of the valuable monograph upon "Rétrécissements du Larynx et de la Trachée, Consécutifs au Tubage et à la Trachéotomie," by Rabot, Sargnon and Barlatier, of Lyons. I hope in a future communication to deal with the treatment of cicatricial laryngeal stenosis, a subject which presents many difficulties to the laryngologist.

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THE PAST AND PRESENT OF OTOLARYNGOLOGY.

·BY P. McBRIDE.

THE idea of writing on the Past and Present of Otolaryngology occurred to me because of the somewhat unusual position I find myself occupying after having withdrawn—as I thought finally—from the practice of the specialties. I may perhaps be acquitted of intentional egotism if I therefore refer shortly to my own connection with them in the past. Beginning practice about 1880, I retired in 1910, but, owing to the unusual condition of matters arising out of the war, it has been my lot to resume hospital work, in which I have been engaged for nearly a year. Fortunately,

since my withdrawal from practice I have kept myself more or less informed as to the progress of Otolaryngology, although my reading for the last six years has of necessity been of a desultory kind. It is proposed to discuss my thesis under the following headings:

(1) A general survey.

(2) Problems which still require further investigation.

I need hardly remind the reader that under the term "Otolaryngology" is included Rhinology, which has of late attained considerable importance.

GENERAL SURVEY.

In 1880 laryngology had already assumed a position of weight, entitling it to be classed among recognised specialties, and it would be no exaggeration to say that the practitioner of to-day could often gain valuable information from a study of the older text-books dealing with diseases of the larynx and pharynx. It is true that there have been important advances. I need only instance the increase of our knowledge of laryngeal paralysis, laryngeal cancer, and the development of the direct method of examination as applied to the larynx, trachea, and bronchi. Again, following, or perhaps I should say initiating, the line upon which rhinology, and more particularly otology, have progressed, laryngology has shown a tendency to annex new territory. Thus we have seen the development of œsophagoscopy and the birth of gastroscopy as well as the passing of external operations for the removal of malignant disease of the larynx into the domain of the specialist. On the whole, however, the student who compares the text-books of nearly forty years ago with those of to-day will find remarkably little change, allowing for the time that has elapsed since they were written. I suppose that this fact is due to the objective nature of the science, as whenever laryngoscopy became perfected there was little room for theorising.

When we consider otology and compare the older works with the new a remarkable contrast is discovered. In these older text-books we may well be struck by the relatively small amount of information conveyed, and more particularly by the large number of pages required to convey it. We are further impressed by the attempts of many of the authors to exaggerate the importance of otology as it was then known and practised. Of old, as now, the bugbear of otologists was that form of middle-ear deafness which need not now be more defined than to state that it advances

insidiously, and that no very definite deductions can be drawn from inspection of the membrane, while there are no adenoids and frequently no gross lesions of the nose likely to involve the middle ear. The type I refer to is familiar to every specialist. Of course we now know more about these cases and realise that some are due to otosclerosis and some to adhesive processes, the result of catarrh—as it is said, but sometimes without any evidence of such catarrh—past or present—so that we may compromise by substituting the term inflammatory process. We in years gone by knew how hopeless most of such cases were just as well as we know it today. We realised that a few derived some benefit from opening the Eustachian tubes, but that, failing improvement from this, no treatment was likely to avail. Yet during the last thirty-six years we have had all kinds of sensational suggestions as to treatment and—what I have never been able to understand—these methods were often supported by arrays of cases believed to have been benefited or cured. At one time it was claimed that the impaired hearing was caused by insufficiency of the palate muscles or tensor tympani, and electricity was advised and said to have given excellent results. A little later it was thought that the hope of these poor deaf people lay in operative rhinology, and the smallest nasal irregularity was diligently sought after and corrected. This really was perhaps the most serious matter of all, because few of us possess perfect noses, and the credulous otorhinologist of that time could almost always find something to do. Again, at a comparatively recent period, it was suggested that in massage with a preparation extracted from bone marrow we had a panacea for otosclerosis. Those who know anything of aural surgery also know perfectly well that such methods of treatment as I have referred to never do and never did remedy the deafness for which they were applied, and it is a most interesting psychological speculation as to how a number of scientific men, presumably honest, could bring themselves to publish more or less impossible results. Probably the explanation is to be found first of all in the fact that even the most restrained among us is more ready to credit what he desires to believe, and thus deceives himself. Then in certain instances we must allow for a mistaken diagnosis, and finally for the occurrence of a functional element which has been overlooked. Moreover, in certain deaf people there is an almost pathetic desire to imagine that they are hearing better, which makes them unconscious accessories to the exploiting of useless methods of treatment.

Again, in the more or less hopeless forms of middle-ear deafness, various operations have been from time to time recommended—incision of the anterior and posterior folds of the membrane, of the membrane itself in order to alter conditions of tension, mobilisation, and even removal of the stapes and section of the tensor tympani. Perhaps on this matter I cannot do better than repeat what I wrote on the subject in my text-book as a summary of my views: "I have thus endeavoured to lay before my readers a critical digest of the operative methods which have been suggested, and to keep my individual opinion in the background. For my own part I do not perform these operations in this class of case—excepting section of the posterior fold—because with this single exception there seems to be an element of risk in all of them. The tendency of modern otologists—more particularly of the German school, who have in this respect been followed to some extent by American, French, and Italian authorities—is too much towards operations which are at best purely experimental. It would be no unfair criticism to state that, perusing a chapter on this matter in any of the larger German works, the idea remains with the reader, that otologists have vied one with another to cut out ever-increasing portions of the tympanic structures, that their reasons for doing so are not always sound, and that most credit is acquired by him who has extracted most."

In this connection I am reminded of a somewhat interesting conversation I had with a well-known German otologist during one of the international congresses. It occurred in the evening, and there had been a certain circulation of the juice of the grape. The subject I ventured gently to introduce was the question of section of the tendon of the tensor tympani, on which I knew my companion had expressed views savouring of Teutonic cocksureness. When, therefore, I asked him his opinion on the question, I did so with intent to what the vulgar call "pull his leg." We spoke in German, and success attended my effort. The Professor began a voluble tirade, beginning with "Have you not, Herr doctor, read the indications I have laid down, etc." When he had finished, I ventured to explain that I had studied his views, but put the question, "If you in your own person presented the indications as given by you for section of the tendon, would you have it done?" Whether his reply was due to the well-known effect of wine upon veracity, or due to the sudden question, I know not, but he answered, "Ah! that is quite a matter by itself (*eine ganz eigene Sache*)."

Thereafter the conversation languished, for the German professor does not like criticism.

So much then for the older otology, and the somewhat narrow groove along which it tended to seek advancement. Quite a new era has, however, now arrived. With the revival of the mastoid operation upon scientific lines began a period of surgical activity which culminated in extending the work of the aural surgeon to areas which the older specialists relegated to the general surgeon in so far as treatment was attempted at that period. As a result, the modern otologists have probably more experience in intracranial surgery than most of their purely surgical *confrères*, and one cannot help wondering whether we are not within measurable distance of the time when the otologist will take over the whole of intracranial surgery. In addition to the treatment of meningitis, thrombosis of the lateral sinus, and cerebral abscess due to middle-ear disease, the otolaryngologist reasonably considers intracranial lesions arising from suppuration of the accessory cavities of the nose as within his province, and he may further claim that if pituitary tumours are to be attacked by way of the nose his previous training gives him a mastery of technique which the general surgeon must of necessity lack. In reviewing the great strides that have been made on the lines of scientific surgery, I am sometimes led to wonder whether some of the useful older methods of treatment have not been unduly neglected. However, I may have occasion to refer to some of them in detail at a later stage.

In rhinology, as in laryngology, knowledge may be said to have advanced *pari passu* with improvement in methods of objective examination, the chief difference being that while in the latter the methods were more or less complete from the beginning, in the former they advanced more gradually. Thus anterior rhinoscopy made progress with improved light and specula while posterior rhinoscopy was for some unaccountable reason considered as presenting great difficulties. I well remember the statement of a celebrated Austrian laryngologist in one of the first lectures I heard him deliver, that if we put laryngoscopy as the unit of difficulty we should multiply by ten for posterior rhinoscopy. Then again the employment of X rays has improved and consolidated the diagnosis of accessory cavity disease, already much aided by transillumination.

Like otology, rhinology passed through a period of exaggeration, but on somewhat different lines. It assumed two phases, namely, exaggeration of (1) the effects of nasal obstruction, (2) reflex symptoms due to nasal conditions. In both, however, there was a very definite basis of fact. Thus we all recognise the serious

effects of nasal obstruction upon general health, chest, and in some forms of deafness. To the last symptom I shall return later in this paper, but shall here content myself by stating my belief that it is adenoids which generally—if not always—are the cause of impaired hearing depending upon nasal trouble. There was a time, however, when the effects of very minor degrees of abnormality were magnified to such an extent as to cause serious workers very grave doubts as to whether rhinology was not in danger of being discredited by the amount of operative work undertaken. Then again, older rhinologists will remember how extravagantly the doctrine of nasal reflex neuroses was propounded. We know certainly that some cases of asthma, neuralgia and other neuroses are benefited by nasal treatment, but it is more than probable that the good effects are due to counter-irritation rather than to the cure of some minor nasal abnormality. To this point I shall return later. We must nevertheless acknowledge that rhinology owes a debt of gratitude both to those who first pointed out the evils of nasal obstruction and to those who first called attention to the effects of nasal treatment upon certain neuroses—notably asthma. Like otology and laryngology, rhinology has tended to extend its borders, but by no means to the same extent. Certainly the surgical treatment of accessory cavities, the nasal path to pituitary tumours and the occasional occurrence of intracranial mischief following upon disease of the frontal sinus have given a wider field to the rhinologist, but we can here place a fairly definite limitation to his sphere of activity. In this respect laryngology and otology afford a contrast, for the former is still engaged in spreading its conquests by way of gastroscopy and bronchoscopy, while the otologist is also extending his outposts.

PROBLEMS WHICH REQUIRE FURTHER INVESTIGATION.

Removal of Tonsils and Adenoids.

Both in this country and in America it is now the custom to enucleate tonsils, and there is a tendency to do so in all cases. Having reached nearly the end of my professional career before this operation became fashionable, I naturally looked back with astonishment at the good results I had obtained by means of simple tonsillotomy in view of the cogent arguments of the newer school. Of course, even in the old days, we recognised that there were cases of sunken septic tonsils which could not be treated by tonsillotomy, and these we punched out with a suitable instrument.

Even now I do not think we are quite agreed as to the functions of Waldeyer's ring, nor do we yet know for certain that these functions are not of importance. The chief argument employed by the supporters of enucleation is that after it there can be no recurrence, and that it removes for ever a septic focus. My reply would be that we do not yet sufficiently know the possible remote effects of complete removal, and that probably septicity is fostered only in the supra-tonsillar fossa and in the lacunæ. If, therefore, we remove that part which contains the latter and sufficient tissue to drain the former, we have probably attained the required end. If, apart from this, the lymphoid tissue is likely to prove harmful, it would be equally desirable to enucleate adenoids and perhaps also the lingual tonsil, but, as our old friend Euclid would say, this is impossible. It is perfectly true that tonsils subjected to tonsilotomy occasionally recur, but in my experience this has been a rare event if the operation has been performed *lege artis*, and I should therefore consider arguments founded upon it as negligible.

With regard to adenoids, it seems to me that among the public an idea now exists that every child has adenoids, and, therefore, that every child should be operated upon. If I am right it behoves rhinologists to do what they can to combat a view so erroneous. If any of the well-marked signs or symptoms exist, and if the naso-pharyngeal portion of the lymphatic ring be enlarged, by all means remove it; only let us have the diagnosis clearly established. My reason for referring to adenoids here, however, is chiefly to emphasise the fact that a small amount of hypertrophy which can be seen with the mirror, occupying the vault of the naso-pharynx as a flat cushion between the Eustachian orifices, may cause deafness as the only symptom, and that this deafness may be benefited by the removal of such a small amount of lymphoid tissue. It is generally assumed that adenoids cause ear trouble by obstructing the Eustachian tube, but I am inclined to believe that interference with the circulation of blood or lymph is a factor of at least equal importance.

The questions that seem to arise at present are:

(1) Does enucleation of the tonsils in any way seriously affect the organism? To determine this, statistics as to the medical histories of children who have been subjected to enucleation should be obtained, with special reference to infectious disease.

(2) Is it really of importance that the whole tonsil, including its capsule, should be removed in every instance, or is this only desirable in certain cases?

(3) What is the *modus operandi* of adenoids in the causation of deafness?

The Treatment of Chronic Middle-ear Suppuration.

It is, of course, not my intention to discuss this subject in detail. When I began practice one still on occasion met with patients suffering from chronic middle-ear suppuration who had been told by their old-fashioned medical advisers that it was dangerous to stop a discharge from the ears. So much was this idea in evidence at one time that an American writer on Otology very aptly observed that had the Almighty intended us to have running ears he would have created us with them. In those far-off days it occasionally happened that aural polypi were met with which had been allowed to grow until they protruded from the ear, and had in consequence the appearance of rounded tumours covered by normal skin. But *nous avons changé tout cela*, and now the problem which confronts us with regard to chronic middle-ear suppuration is the question between conservative and radical treatment—in other words, shall we confine ourselves to methods directed towards cleanliness and asepsis or shall we operate? There are certain cases in which we can with safety adopt the former method, viz. those in which there is not much secretion and no fœtor, more particularly where the perforation is in the anterior part of the membrane and the secretion mucoid rather than purulent, for in them the fluid is usually due to the Eustachian tube. Another point for consideration is the habitat of the patient, for if it be far from civilisation this forms an argument in favour of radical operation. In the better classes, too, where attention is likely to be paid to medical directions, surgical treatment may be postponed with greater safety than under opposite conditions. The real trouble begins when we meet with what are unfortunately the common run of cases. The perforation is often peripheral and occupies the posterior part of the membrane (or it may be situated in the area known as Shrapnell's); the discharge is fœtid and there may be granulations, while not uncommonly examination points to the involvement of the labyrinth. Of course, when the last-named condition exists and when even without it there is a history of pain, operation is obviously called for, but what of the other cases? It appears to me that in the light of modern knowledge it is almost incumbent upon us to recommend the radical operation in all cases where fœtor tends to recur, for this sign must indicate insufficient

drainage, while the existence of granulations or polypi is additional evidence in the same direction. Yet when I look back, I cannot remember more than one or two cases where the more conservative methods then adopted led to serious results. The removal of polypi followed by canterisation of their bases, the application of chromic acid to granulations, the occasional employment of the attic syringe were to be followed by good results when associated with local applications of peroxide of hydrogen, rectified spirit, syringing with sterilised boracic solution and subsequent drying with sterilised wool carried out by the patient at home. Again, as is well known, we cannot guarantee the effects of mastoid operations upon the hearing, so that this question must also be taken into consideration. Perhaps the best way of arriving at a proper estimation of the problem before us is to introduce the personal equation, and to formulate the proposition something as follows: "If I had a chronic discharge from the ear with peripheral perforation of the posterior segment of the drumhead, but without labyrinthine involvement, what would be my desire as to treatment?" Most of us would probably reply, "Give local treatment a chance; but if fœtor and discharge recur soon after its cessation, let a radical operation be performed." Of course, there may be special circumstances. Thus the patient may be deaf on one side and have discharge from his better hearing ear—the ear upon which he perhaps depends for his livelihood. As I stated before, we cannot foretell the after effects as regards hearing of opening up the middle-ear cavities. Perhaps in such a case, if I were the patient, I should request that the colleague who was good enough to undertake my case should revert to the older method of opening into the antrum from behind the ear without interference with the tympanic structures, and keep the passage clear by the insertion of a leaden plug. In this way the antrum can be syringed out as often as required, and thus many a chronic suppuration was cured in the old days before the introduction of the radical method.

Of course, we meet with many cases of chronic middle-ear suppuration where the hearing is relatively good; but, again, we encounter others where the deafness is marked. In the modern concentration upon the serious dangers resulting from discharging ears, the question of hearing seems to me to run some risk of being neglected. Now, given a perforated tympanic membrane and a discharging tympanic mucosa with marked deafness, inflation of the middle ear will frequently improve the hearing, and where this happens such inflation should be repeated from time to time,

partly on account of the relief it gives, and partly because it will prevent the formation of injurious adhesions during the process of healing. Again, it is no very uncommon thing to meet with patients with perforated tympanic membranes so deaf that they have become incapable of carrying on their work, whose hearing is immediately improved by the employment of a pellet of cotton-wool moistened in an antiseptic, *e. g.* boroglyceride. I would not have referred to this matter, which must be well known to most otologists, had it not been for the fact that on perusing one of the most recent works on aural surgery I found the subject dismissed in a few words without discussion as to indications or description as to method. Having in my own practice met with many people who could not have attended to their daily business without using artificial drums of moist cotton-wool, I have thus ventured to enter a protest in its favour for properly selected cases.

Otosclerosis.

Of course, every otologist is now aware that true otosclerosis is primarily a bone affection which causes deafness occasionally by implicating the labyrinth, but commonly by first causing fixation of the stapes. It has seemed to me, however, that the clinical diagnosis of this condition is by no means clear. That hereditary predisposition plays a part in its aetiology is probably true, while the same may be said of pregnancy; but I need not retail the statements as to this matter, which can be found in every text-book. Judging by the reports from some clinics, certain authorities regard otosclerosis as a rare affection, while my own impression is that it is a common ailment. In most cases we have the classical symptoms of middle-ear deafness—increased bone conduction, impaired hearing of low notes with relatively good appreciation for high tones, while the victims often hear better in a noise. Tinnitus and sometimes giddiness are complained of. There is usually no gross lesion of the naso-pharynx, and often anterior rhinoscopy reveals nothing of note. The appearance of the tympanic membrane is rarely characteristic, although in a few instances it presents a flamingo-red tinge which, when it occurs, may be considered pathognomonic. The victims of this form of deafness occasionally find that hearing is made worse by colds, but many of them will also be made more deaf by fatigue, both physical and mental. As I have said, the drum membrane may be normal, but it seems to me that a certain amount of thickening and even

in-drawing are by no means to be excluded. Again, some authorities describe the Eustachian tubes as always free, but I have seen cases presenting all the other signs and symptoms of otosclerosis where the tubes were narrowed. I am therefore inclined to think that the clinical diagnosis of otosclerosis is in many cases impossible, but that a serious error is committed by those who, while using the term, confine its application to those cases in which the membranes are either quite normal or present the characteristic flamingo tinge. Of all the symptoms I should feel inclined to consider increase of deafness after pregnancy, fatigue, or mental strain as the most characteristic.

As I have said, it seems impossible to differentiate clinically between certain forms of otosclerosis and deafness due to intratympanic inflammation which has run its course and left no typical changes, but in a minority of cases this can be done. In such cases it would seem advisable to study not only the ear, but also to make a careful investigation of the patient's general condition. Some years ago the question of blood-pressure in these cases was discussed, and it might be well to further develop this line of research. Thus the exacerbations caused by pregnancy and fatigue might be studied from the general rather than the local point of view. It seems to me that these exacerbations which are sometimes temporarily recovered from cannot be due to actual changes in the bone, but must depend upon some transitory condition of the circulatory or nervous system, which might repay further investigation.

Relation of Nasal Conditions to Deafness.

Of course we all recognise adenoids as a common cause of deafness, and occasionally a naso-pharyngeal tumour may bring about the same result. It has always been stated that obstruction caused by conditions existing between the choanae and nasal orifices may produce a similar result, but so far as I am aware we have as yet no proof of the truth of this statement. The argument seems to have been: adenoids cause deafness, therefore other forms of nasal obstruction will also cause it. We know, however, that very marked nasal obstruction may exist—as, for instance, when due to polypi—and no deafness result. I am by no means bigoted, but none of those who have asserted so positively the connection between nasal obstruction and deafness of the chronic catarrhal type seem ever to have brought forward a series of cases to prove it—surely a

very simple matter if such cases are common. All that would be required could be done so simply—a series of cases, hearing carefully tested—nasal operation, but no other treatment, and hearing again tested—*Voilà tout ! c'est fini*. What makes me still sceptical is that this simple proof has never been given. Years ago I remember discussing this matter at intervals of some years at two meetings of otologists. At the first an aural surgeon of great experience adduced a case which impressed itself upon my mind, although it seemed to me that all the required data were not present. Again, at the second meeting—after an interval of years be it observed—the same case was forthcoming, and, incomplete as it was, it was the only one brought forward which seemed to me at all convincing. I think, therefore, otologists would be grateful to anyone who could adduce a series of results in which no other treatment than the removal of nasal obstruction was employed.

Modern Methods of Examining Labyrinth and Possible Results.

In our methods of examining the labyrinth both cochlear and vestibular recent advances have been of great assistance. By the aid of tuning-forks of different pitch, and notably the monochord, we are enabled to test the hearing with far more accuracy than formerly. Again, both the caloric and rotation tests have proved of material assistance in arriving at a conclusion as to the condition of the vestibular apparatus in any given case. It has seemed to me, however, that the latter object might well be further aided by employment of the older balancing tests such as standing and hopping on one foot.

I sometimes wonder whether the caloric reaction in the form of nystagmus is really due to change of temperature in one or other of the canals. Certainly I am prepared to admit that the evidence in favour of this view is of considerable force, *e. g.* the fact that if the ear be obstructed by polypus or granulation the reaction takes longer to produce, etc. At the same time, on general physiological principles it is difficult to conceive that cooling of the canals can occur sufficient to produce physical changes in the endolymph. It may be justly objected that if this hypothesis perfectly explains the observed facts then it must be accepted until disproved, and this cannot be gainsaid. The only alternative explanation that suggests itself is that the heat and cold may act by causing vasomotor changes. It might be possible to prove or disprove this suggestion by the local employment of certain substances.

For a long time past I have held the opinion that it would be of great interest to test the effects of some drugs upon the balancing mechanism, but when opportunity offered time was not available, and *vice versâ*. The special drug I had in view was alcohol. Of course everyone knows that in large doses it affects the balancing apparatus, but it would be of great interest to test the effects of small doses upon equilibrium and also upon labyrinthine reactions—caloric and rotatory. The amounts might be gradually increased and effects recorded. It would no doubt be relatively easy to get patients to offer themselves for observations of this kind, but some practical inconvenience might arise when larger doses were reached. If, as is to be expected, interesting results were obtained from the exhibition of alcohol, other drugs such as quinine, salicylates, and perhaps tobacco might be experimented with.

Nasal Reflex Neuroses.

As has already been suggested, some observers exaggerated the importance of nasal reflex neuroses. At the same time in certain quarters the opposite tendency has prevailed, and it seems possible that in this age of larger surgery little time may often be left for the investigation of this interesting and important subject. Of neuroses connected with the nose we are probably agreed that asthma is the most important. It has long been known that the removal of polypi—especially the small and mobile variety—is often followed by great benefit in asthmatic subjects. Again, canterisation applied to various parts—sometimes the inferior or middle turbinateds, sometimes the septum—is often followed by amelioration. In this connection I have observed that if a cough can be produced by touching any particular spot within the nose, canterisation of this spot will often be followed by good results. This may occur even when no abnormality is detectable. At the same time positive cures are rare, although amelioration can often be obtained. Next to asthma supra-orbital and some occipital neuralgias may be placed in order of frequency. In some of these cases, too, good results follow nasal canterisation. That other forms of neurosis can occasionally be favourably influenced by nasal operations must be admitted, but they either are very rare or the symptoms can be accounted for on mechanical grounds; as, for instance, nocturnal enuresis as a result of nasal obstruction.

I have referred to this subject for two reasons. In the first place, the absurdly large number of cures of asthma claimed in

some quarters has tended to discredit an occasionally valuable method of treating a very obstinate complaint; and in the second place, nasal canterisation seems to be too rarely employed in obstinate neuralgia. In both affections the nose may be for all practical purposes normal, and yet we may find in it a valuable situation for the employment of counter-irritation in the form of electric cautery. It seems to me that investigations on these lines carried out upon a series of cases, both asthmatic and neuralgic, might yield very interesting and instructive results. Such treatment would not be purely empirical, but can be amply justified on scientific grounds. It has been absolutely proved that the removal of nasal polypi does in certain cases greatly benefit or cure asthma. The polypi in such cases are often small and mobile without causing any appreciable interference with the passage of air. Obviously then they must act as irritants. I need not quote further evidence which could be adduced to prove that nasal irritation may cause asthma, but shall assume the fact as admitted. We thus arrive at the statement that the irritant produces a change in some central area—let us say from stability to instability—from which asthma follows. Suppose now that in an asthmatic the nose is quite normal, it follows from what has just been said that the application of a stimulus in the form of electric cautery to the nasal mucosa may again produce a change, but in this case from instability to stability.

Naso-pharyngeal Hypersecretion.

Probably every rhinologist realises the unsatisfactory state of our knowledge with regard to a certain type of case. I refer to those in which nasal trouble is confined to the naso-pharynx, and in which there is either fluid purulent secretion or more frequently crust formation. When liquid or crust is removed posterior rhinoscopy does not as a rule throw much light on the source of the discharge. Now some of these cases depend upon the presence of the remains of previously hypertrophied lymphoid tissue, and probably in a certain number there remains a central cleft from which secretion issues, either retaining its liquid form or rapidly drying into crusts, but I have rarely been able to satisfy myself by ocular demonstration that this was the case, although I have known benefit follow the use of the eurette. It has occurred to me that if the vault of the naso-pharynx were kept under observation for an appreciable time after crust or fluid had been carefully removed, light would be thrown on the

pathology of a condition which, although not dangerous, renders its victims excessively uncomfortable. Such direct inspection would probably be possible by the use of a palate hook, with the head hanging over the end of a table, with or without a general anæsthetic or by means of the pharyngoscope.

Operations for Deviated Nasal Septum.

It must at once be admitted that, so far as breathing results go, submucous resection has shown itself superior to any of the older operations. Of the latter perhaps the best was that recommended by Aseh, but it was certainly a "bad best," if I may be allowed the expression. Now in women and in men who are not likely to engage in any occupation or pursuit in the course of which a blow on the nose is probable, there can be no objection to submucous resection. In boys or young men who are likely to indulge in sports where an occasional blow may be expected, the case is otherwise. It seems to me that in such instances an attempt should be made to free respiration with a minimum removal of cartilage and bone. I have not had the opportunity of seeing patients in whom cartilage has been replaced after resection, and it may be that thus my objection may be eventually met. It is possible, too, that in many cases a smaller removal than is usually practised would suffice.

Unless the rhinologist has instincts which make for an active life he may not always realise how removal of so much of the supporting framework of the nose may handicap a boy or even a young man. I admit that I do not know what would be the effect of a blow on the nose after extensive resection, but on general principles I think we must assume that it would be serious in the sense of being likely to produce deformity. If that be so, the operation must be followed by advice to abstain from pursuits in which injury to the nose is possible. Just consider for a moment what this means to a youth whose inclinations lead him in the direction of a strenuous life. He must not play football, he must not box, it will be safer not to ride, as either a fall or throwing up of the horse's head may injure the nose, and even if he avoids all such obvious risks something may easily happen unexpectedly which results in disaster. Thus if the patient be young we cut him off from many healthy recreations and we tend to induce a state of mind which cannot be desirable. In other words we prescribe the life of what is contemptuously called a "molly-coddle." Again, I don't know that we have yet sufficient

data as to the effects of resection in early life on the subsequent growth of the nose. I would venture to suggest, therefore, that in boys and in young men resection should only be carried out if absolutely essential, and that when this is the case an attempt should be made to preserve as much bone and cartilage as is compatible with the attainment of free respiration.

Breathing Exercises in Nasal Cases.

In certain minor forms of nasal obstruction, especially when the cause is alar collapse or small adenoids, great benefit may be derived from carefully regulated exercise, and the same is true in certain cases where there is a tendency to recurrent nasal catarrh. It is not my intention at present to enter into any detailed account of breathing exercises, but rather to point out that the subject is quite simple and that a few exercises, which could be taught in half an hour are all that are necessary for the patient to learn. In most cases, however, it will be much to his advantage not to confine himself to respiratory exercises, but employ in addition movements calculated to affect all the muscles of the body. It is most unfortunate that there has been a tendency to exaggerate the complexities of all these exercises. Thus we have people prescribing various complicated movements for respiration whereas the essentials are simplicity itself, while the complication merely serves purposes of exploitation. The same, too, applies to exercises affecting the trunk and limbs, although owing to the numerous muscles involved, some skilled instruction is here desirable.

As has been already stated, it is better—unless some definite counter-indication exists—to combine respiratory with general exercises, as we thus retain a proper proportion between thoracic and general musculature. This is not the place to discuss the undoubted benefit which ensues in the case of gouty, plethoric, and many so-called rheumatic persons. As regards the upper respiratory tract there can be no doubt as to the satisfactory results which can be obtained in the affections mentioned at the beginning of this paragraph.

CLINICAL NOTES.

NASO-PHARYNGEAL NEOPLASM, PROBABLY MALIGNANT,
DISPELLED BY RADIUM.

By A. BROWN KELLY, M.D., D.Sc.,

Victoria Infirmary, Glasgow.

JAMES — aged fifty-seven, was sent to me on October 31, 1914, on account of nasal obstruction. This had been first noticed six or seven months previously, and had gradually increased. Three weeks prior to visiting me he had had very severe bleeding from the nose and mouth, and in consequence was much debilitated.

On examination, the nasal fossæ proved to be normal, but the nasopharynx was found to be largely occupied by a growth. This was attached to the roof and rested on the palate: it hid the entire right posterior naris and all but a small outer segment of the left posterior naris; it impinged on the mouth of the right Eustachian tube, the corresponding ear being markedly deaf; and its surface was irregular, finely granular, and red in places.

I regarded the neoplasm—which was unlike a fibroma—as undoubtedly malignant, but refrained from taking a piece for microscopic examination owing to the recent profuse hæmorrhage. The removal of the growth by surgical measures was recommended.

The patient was not seen again for two and a half months, when his condition was found to be much the same as at his previous visit. As he was disinclined for operation he was sent to Dr. James R. Riddell for an opinion as to the advisability of using radium.

On January 27, 1915, Dr. Riddell prepared a packet of 50 mg. of radium screened with 2 mm. of silver and covered with 2 mm. of rubber. A thread was passed through each nostril into the mouth and tied round the radium, which was then drawn into the naso-pharynx so as to lie between the growth and the soft palate. It was kept in this position for twenty-four hours. For a week afterwards the patient suffered a good deal from ulceration of the palate and fauces.

On March 10, he reported that his nose was free and that he had gained in strength. He considered himself cured. A small rounded mass of the growth was still present, however, on the roof of the naso-pharynx, hanging down so as to conceal the upper half of the septum. Radium was again introduced as described, drawn forward against the edge of the septum, and retained in position for twenty-four hours.

The patient next reported himself on May 14, when he stated that he felt stronger than for many months. There was no sign of the growth, but its site of origin on the right half of the roof of the nasopharynx was indicated by an adherent crust of mucus, the removal of which revealed an apparently healthy surface.

On June 2, the appearance of the naso-pharynx was the same as at the previous visit. Radium was applied a third time for a period of twenty-four hours.

He was last examined on February 22, 1916; there was still crusting behind the right choanal arch, but the underlying surface was healthy, and showed no sign of recurrence of the neoplasm.

ENDOTHELIOMA OF NASO-PHARYNX APPARENTLY CURED BY RADIUM.

BY JAMES ADAM, M.D.

A LADY, aged thirty-six, and in good general health, was sent to me by Dr. John Graham, Langside, Glasgow, in September, 1915, with a story of discharge from the right ear for nine months; she had had a feeling of "soreness" in it for a year. There had been chronic suppuration, with slight discharge, in the left ear from infancy.

The right external canal was dilated with what at first sight looked like a large osteoma. This growth was firm to the touch, but lacked the hardness of a bony growth, and entirely filled the canal. A few small granulations from pressure erosion were just beginning to sprout. In the left tympanic membrane was a large perforation surrounded by bleeding granulations; a little pus.

It was obvious, however, from the patient's intonation that there was some nasal obstruction. The right choana was found to be entirely occluded, the right half of the palate to be pressed downward. The pharyngoscope showed a large, mulberry-like tumour, bleeding readily to the touch, completely filling the right half of the naso-pharynx and projecting slightly to the left of the vomer. Its attachment could not be definitely made out, but it seemed to be growing from the Eustachian orifice. The adjacent vessels on the pharyngeal wall were somewhat injected.

The patient had not complained of nasal symptoms to her doctor, but on cross-examination she said she could remember symptoms of obstruction in the right nostril for two years; for the last year there had been glairy discharge, steadily increasing deafness, and latterly soreness but not acute pain in the ear. No enlarged glands could be felt.

Except for cataract of left eye, noticed three years ago and probably connected with a fall on the head, there was nothing to note in the general condition. Wassermann negative.

The growth looked malignant, and in this opinion Mr. R. H. Parry, surgeon, agreed, and declined surgical interference as, in his experience, interference only shortened the patient's life. Under general anaesthesia I removed the growth from the ear. Dr. Teacher, pathologist to Glasgow Royal Infirmary, examined microscopically and had no hesitation in pronouncing the growth to be endothelioma.

On November 29, with the help of Dr. J. R. Riddell, I tied 50 mgr. radium bromide screened by 1 mgr. gold into the naso-pharynx close to the tumour and let it remain for twenty-three hours. After this for a fortnight there was a good deal of dirty discharge from throat and nose, and for a week some difficulty and pain in opening the jaw. Within a fortnight the tumour had shrunk so much that through Yankauer's speculum all that could be seen of the growth was a small mass round the Eustachian orifice: the right was quite free, the discharge had stopped from both ears. (The usual treatment had been adopted for the left ear. Boric spirit was instilled into both.) By the middle of January the only trace of the disease was the thickened rounded margin of the Eustachian opening which was greatly dilated so that one could see some considerable way up the tube. The rim of the orifice came quite to the middle line. The right tympanic membrane healed with a depressed cicatrix and there was no trace of growth here.

On January 12 the same amount of radium was again tied in for eleven hours. At present date the parts look normal except that the tubal orifice is large and somewhat crateriform.

Hearing.		Right.	Left.
September, 1915	Whisper	Nil	4 ft.
	C. V.	4 in.	8 ft.
February, 1916	Whisper	12 ft.	20 ft.

It is, of course, too soon to say whether the cure will be permanent, but this much can be said: that the result is infinitely better than could have been got by any surgical interference.

LATERAL SINUS DISEASE: THREE CASES OF INTEREST.

By ARCHER RYLAND, F.R.C.S.E.

Capt. R.A.M.C.

LATERAL SINUS THROMBOSIS WITH EXTRA-DURAL ABSCESS.

PTE. S—, aged twenty-five, was admitted to hospital in December, 1915, complaining of a discharge from the right ear. There was no complaint of pain within the ear, or in relation to the mastoid.

The history of the case was that of a sudden onset of the discharge a few days before admission.

On examination it was found that there was a purulent discharge, moderate in amount and not offensive, from the right tympanum. There was a diffuse inflammation involving the whole surface of the tympanic membrane. An anterior inferior perforation was present, through which the discharge appeared to have a free exit.

The condition was treated by means of antiseptic drops and the occasional use of a negative pressure speculum.

During the course of the treatment, and when the middle ear seemed to be progressing normally, there was a sudden onset of pronounced signs referable to lateral sinus involvement.

There was no change with regard to the aural discharge or to the appearance of the membrane.

On palpation, mastoid tenderness could now be elicited, and it was found to be at its maximum just in front of the tip of the process. This tenderness extended down the neck for almost two inches in the line of the deep jugular vein. There was no mastoid swelling or oedema.

The temperature mounted in three days to 105° F.; the pulse-rate to 100 from a previous average of 74. The only facts that pointed in the direction of a meningeal involvement were a slight cervical rigidity on raising the head from the bed, and a certain restlessness of feature that occasionally bordered upon a definite facial twitching. An examination of the eyes showed them to be normal. There were no signs referable to the labyrinth. There were no rigors, but the patient had profuse perspirations, which lasted for hours at a time. The mental condition was unimpaired. The leucocyte count was 7500.

In view of the temperature reading, the rapid pulse, and the general condition of the patient, it was decided to explore the mastoid without delay. Preliminary lumbar puncture gave a normal result, and the fluid gave the chemical reactions of health.

On exposing the mastoid bone, there was no oedema of the periosteum or abnormal appearance of the mastoid cortex.

The antrum was found to be small and deep and considerably encroached upon by the lateral sinus groove, which was situated far forward and unusually high up. An extra-dural perisinus abscess was evacuated at the region of the genu. The wall of the sinus was unhealthy, of greyish-white appearance, and free from granulations. A free exposure of the sinus wall was secured. There was no pulsation. No hæmorrhage followed an exploratory puncture of the wall.

On the basis of these findings the deep jugular vein was now exposed in the neck. There was no thrombosis within the vein. A ligature was applied to the walls, and the vein returned to its position in the wound.

A free incision was now made into the lateral sinus wall, and a condition of complete thrombosis was discovered. The clot was removed from the lumen with a curette. The chief mass of it lay immediately deep to the sinus incision, and between that situation and the jugular bulb. Very free hæmorrhage followed removal of the clot.

Within forty-eight hours of the operation the temperature had dropped to normal and the pulse-rate to 76. The patient made an uneventful recovery.

With regard to the operative procedure in this case, the tympanum was left untouched. No attempt was made to flush through the deep jugular vein from below. The vein itself was not divided between ligatures, but was simply ligated and replaced in the wound. The mastoid process was of normal density, and could not be described as definitely of the compact or of the pneumatic variety.

As to this particular case the critical fact seems to have been the anatomical relation between the mastoid antrum and the lateral sinus groove.

No bacteriological investigation of the discharge was made, but the anatomical relations described in combination with a micro-organism of a probably high virulence will well account for the particular course which this case pursued.

LATERAL SINUS PHLEBITIS WITH EXTRA-DURAL ABSCESS.

Pte. P.—, aged thirty-nine, was admitted to the hospital complaining of a right aural discharge and of headache, which was chiefly present in the right parietal and occipital regions. The aural discharge had been present for three months.

On examination it was found that the external auditory meatus was small and of the laterally narrowed type. The discharge was slight, and, according to the patient's history, had never been much in amount. There was a posterior perforation of the tympanic membrane, of which, however, otoscopy gave only a very partial view.

Ordinary antiseptic treatment was commenced. The temperature remained normal, but the pain in the head continued as before, as a persistent diffuse headache in the right occipital and post-parietal regions, and kept the patient awake at night. There were no external signs of mastoiditis, and, indeed, no rise of temperature.

It was judged advisable to lay open the mastoid antrum and then to perform, if indicated, a conservative operation upon the middle ear.

On incising over the mastoid the superficial tissues and periosteum were found to be normal. The mastoid process was decidedly of the pneumatic type. When the mastoid cells were opened the disease was found to lead downwards. The cell walls, soft and crumbling, were easily broken

down with the burr. While using the burr in this manner, there was a sudden gush of pus from the region of the lateral sinus groove. About two drachms of pus were evacuated from this region. The lateral sinus wall was now freely exposed. It was found to be covered with freely bleeding red granulations. Such of these as could be easily removed were curetted from the venous wall. Cellular disease was followed down and removed as far as the tip of the mastoid.

The antral orifice of the aditus was found to be blocked with granulations, and the radical operation was completed. The incus was found to be intact, while the malleus revealed an early necrosis of the long process and the presence of one or two small granulations in connection with the upper part of the body of the bone.

The patient made an uneventful recovery.

The case affords an illustration of the danger of an infected tympanum in conjunction with a large pneumatic mastoid and a narrowing of the osseous meatus.

LATERAL SINUS THROMBOSIS WITH CEREBELLAR ENCEPHALITIS.

Driver G. M.—, aged eighteen. The patient was first seen on October 28, 1915. He complained of deafness in both ears, severe headache, discharge from the left ear, and pain in the right ear, from which he stated there had been discharge some weeks previously. The patient had been ill for four days, and had had within that period acute pain in the right ear. On general examination it was found that cervical rigidity was present on raising the head from the pillow. Kernig's sign was present. The knee-jerk was only present on the left side. There was no spontaneous nystagmus and no affection of the ocular muscles or pupils. Well-marked optic neuritis was present with regard to both discs. There had been occasional vomiting. The pulse was slow and of the cerebral type. Cerebration was not noticeably impaired.

Lumbar puncture yielded a clear fluid under decisively increased pressure. Leucocyte count, 20,000.

On examination of the left ear a chronic suppurative otitis media was found, showing evident signs of long-standing disease. There was a total destruction of the tympanic membrane, advanced necrosis of ossicles, caries of the lower margin of the outer wall of the attic, and in this situation there was a mass of septic granulations. The inner wall of the tympanum was exposed to view, but partially concealed by *débris* and granulations. A profuse purulent and very offensive discharge was present in the tympanum and external auditory meatus. There was no mastoid tenderness present, and no swelling or oedema over the mastoid process.

On examination of the right ear the tympanic membrane was found red and inflamed. The handle of the malleus could not be definitely located. There was some degree of bulging of the membrane with regard to the two posterior quadrants. There was a small perforation in connection with the anterior half of the membrane. There was no evidence of discharge from the tympanum, and no pus in the meatus. There was no mastoid tenderness, and no evidence of oedema or swelling over the mastoid.

The radical mastoid operation was performed on the left side. Disease was found to be chiefly localised in the region of the aditus, tympanic cavity, and attic. There was a small quantity of thin pus in the

mastoid antrum itself. The external semicircular eminence was exposed and found to be intact. Posteriorly the bone in the region of the lateral sinus presented a healthy appearance, and the sinus wall was therefore not exposed.

Exploration of the temporo-sphenoidal lobe through the roof of the operation cavity was carried out, but with negative result. No extradural abscess was present.

While still under the anæsthetic a paracentesis tympani was performed on the right side. There was no escape of pus from the tympanum. On the following day some foul-smelling pus was found to be present in the right meatus. There was no improvement in the patient's condition. The temperature remained high, and the leucocyte count rose to 35,000.

It was decided to explore, without further delay, the temporal bone on the right side. The lateral sinus groove was found to be lying far forward. On opening into the groove a small collection of purulent fluid escaped. There was no pus in the mastoid antrum. The anterior surface of the sigmoid sinus was now exposed. A small perisinus purulent collection was evacuated during the procedure. The exposed sinus wall presented very obvious signs of disease. A septic, lymph-like deposit was distributed over its surface, and a deposit of similar nature was found to be extending over the surface of the dura mater downwards towards the direction of the jugular bulb, and also forwards towards the region of the internal auditory meatus. The sigmoid sinus was further exposed, and in an upward direction towards its continuation with the lateral until healthy sinus wall was reached. Dura mater overlying the cerebellum, both in front and behind the sigmoid sinus, was exposed. That part of the cerebellar dura which lay in front of the sigmoid showed marked evidence of disease. It was freely exposed by removal of bone lying in relation to the medial wall of the antrum. The temporo-sphenoidal lobe was now explored for localised abscess, but with negative result. Explorations for the discovery of anterior cerebellar abscess, and for posterior cerebellar abscess, were both attended by negative result. A free longitudinal incision of the sigmoid sinus wall was made, followed by an instant copious hæmorrhage. The hæmorrhage was at once controlled, and the operation brought to a conclusion.

On the following day the leucocyte count rose to 45,000. There were one or two rigors, cyanosis, and much restlessness. The spinal fluid remained clear, but still under increased pressure. The optic neuritis remained unchanged. On the following day the patient relapsed into a comatose state. Stertorous breathing came on and he died.

Post-mortem.—Necrotic softening and disorganisation (purulent encephalitis) of the anterior portion of the right lateral lobe of the cerebellum, both deep to, and anterior to, the sigmoid sinus. The right lateral and sigmoid sinus were found to be occupied by firm clot. The left lateral and sigmoid were healthy. There was no basal meningitis apart from the lesion already described. There was no other focus of brain sepsis.

The special points of interest with regard to the case appear to be the following: (1) The difficulty of coming to a right decision as to which temporal bone should be explored. In this case the wrong decision was made, and the left side was explored first. (2) Rapid masking of lateral sinus symptoms by cerebellar symptoms and the consequent greatly increased difficulty of diagnosing either condition. (3) Failure during the operation to discover the cerebellar focus. (4) Apparent absence of clot on opening up the right lateral sinus during operation. (5) Decided bilateral optic neuritis. (6) Absence of spontaneous nystagmus.

I have to say that Lieut. A. B. Gordon, R.A.M.C., M.D., F.R.C.S.E., for whose able assistance in this case I am greatly indebted, was from the beginning in favour of exploring the right mastoid first. This plan, however, was not adopted, and the operator explored the left mastoid on the ground that the changes of middle ear disease on that side were obviously further advanced.

SOCIETIES' PROCEEDINGS.

PROCEEDINGS OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION.

Held in Atlantic City, New Jersey, May 25-27, 1914.

(Continued from p. 261.)

Leucoplakia Buccalis and Lingualis.—**Robert Levy** (Denver).—This paper is intended to review the bibliography from 1902 to the present time, and to offer a critical analysis of opposing views.

The author presents a case as a text. The patient had been under his observation continuously for seven years, during which time the case passed through the various changes incident to leucoplakia. Large papillomatous masses developed, and a diagnosis of carcinoma was at one time made, resulting in the extirpation of the lower jaw. Subsequent papilloma and leucoplakia again occurring, doubt was thrown upon the diagnosis of malignancy.

Microphotographs showing the development of papilloma as well as the histology of leucoplakia are presented. The author discusses names, definitions and varieties, etiology, pathology, the frequency of cancer: pathological manifestations indicating the development of carcinoma, clinical manifestations indicating cancer and treatment.

The author arrives at the following conclusions:

(1) Leucoplakia is of special interest because of its doubtful ætiology and because of the dispute regarding the question of degeneration into epithelioma.

(2) The case reported shows the uncertainty of the diagnosis of malignancy. The most definite clinical appearance cannot always be relied upon.

(3) Leucoplakia is a generic term. Excluding syphilitic lesions, it may be considered a pathological entity.

(4) The views of writers who attempt to show the degeneration into cancer are not tenable in the light of our present understanding of the genesis of cancer. Degeneration of existing cells into cancer cells does not take place. A cancer is such from the beginning, and is not caused, only influenced in its development, by irritative lesions.

(5) Our understanding of leucoplakia has been confused by attempts to describe a "precancerous stage," or to establish the theory of its "degeneration" into a malignant growth. Leucoplakia may, however, be looked upon as a warning.

(6) Certain clinical manifestations may arise which, though not positive, are sufficient to arouse the suspicion of malignancy.

(7) The results of treatment are unsatisfactory. Fulguration offers considerable encouragement.

Dr. JOHN F. BARNHILL: During the past year I have had one case of this nature. The patient, a woman thirty-two years of age, had formerly lived in Indiana, but because of tuberculosis had moved to Florida, where she had been living for four or five years. When she came to consult me she had this condition, as diagnosed by a number of physicians, pathologists, bacteriologists, general practitioners, and laryngologists. She also had tonsillitis. She would not allow operation because of the tuberculosis. She had been treated by means of X-rays, washes, etc. The mouth got absolutely well, and the patient is much better generally.

Dr. THOMAS HUBBARD: I have had three cases of this kind. I had a good deal of difficulty in establishing the diagnosis between this and pemphigus. In one case the patient had pemphigus, but the lesions in the throat were not typical pemphigus lesions, and had the case not gone on to typical pemphigus of the skin, the diagnosis would not have been cleared up. In another case this condition occurred in a man who had syphilis. He was a heavy smoker. The third patient was also a heavy smoker. He smoked from twenty to thirty cigars a day. After one week's cessation of smoking there was a complete disappearance of the lesion. These were typical leucoplakia lesions.

Dr. E. FLETCHER INGALS: About thirty years ago I reported a case of leucoplakia treated with the cautery, with cure. The lesion was not more than a centimeter in diameter.

Dr. EMIL MAYER: I think leucoplakia is practically always the forerunner of malignant disease. I have under my observation at the present time a patient who, fifteen years ago, showed the first signs of leucoplakia. Within the year he has developed epithelioma. I have seen a number of such cases.

Dr. CHARLES W. RICHARDSON: The cases which I have seen have usually been so extensive that any of the operative measures suggested here or elsewhere would be entirely out of place. In the last case which I had, not only the whole dorsal surface of the tongue, but the buccal cavity as well, was involved. The man had the most intense pain. He has since died. In all probability it would have developed into malignant disease. In some of the cases the dorsum of the tongue, the surface of the hard palate, the under surface of the tongue, and the buccal walls were involved.

Dr. D. BRYSON DELAVAN: Most of the cases which I have seen have become malignant. Any irritative course of treatment is particularly contraindicated. Elimination of the source of irritation, as in tobacco smoking, will result in improvement. In view of the malignant tendency of this condition, it would seem that radium would offer advantages not likely to be realised by the older forms of treatment. Some cases have been subjected to this treatment and have improved under it. I do not know of a case, however—the matter being a recent one—in which a cure is said to have been effected.

Dr. LEVY (closing the discussion): The case cited by Dr. Barnhill, of tuberculosis, might have been a case of leucoplakia suffering with tuberculosis. I have never seen a case of leucoplakia caused by tuberculosis, nor do I see how this could be determined. If it were due to tuberculosis, it was certainly remarkable. The fact that it got well is evidence that it was not leucoplakia. Various other skin diseases have been mentioned in this connection. Dr. Ingals went over the subject very thoroughly in

his paper, which was one of the most satisfactory papers ever written concerning this condition. The question of leucoplakia always terminating in cancer is, of course, an important one. In the full text of the paper will be found many views for and against. The case I reported is an unusual one in view of the extent of the lesion. Other cases quite as extensive have not developed malignancy. It is not necessary for the case to terminate in cancer. The lower jaw, the parotid gland, and the surrounding structures were all removed, yet it was not cancer, as proved by the subsequent history of the case. If we wait long enough we may find cancer developing in the patient who had leucoplakia. Given a case of leucoplakia, however, it is not necessary that it will terminate in cancer. In cancer cases, undoubtedly, it is often possible, by going back far enough, sometimes as far as forty years, to find that the patient had leucoplakia. While cancer may be antedated by leucoplakia in many instances, it is not proved that all cases of leucoplakia will terminate in cancer. Leucoplakia of the tongue is reported by some writers as being more likely than that of other localities to terminate in cancer.

Hyperplastic Sphenoiditis and its Clinical Relations to the Second, Third, Fourth, Fifth, Sixth and Vidian Nerves and Nasal Ganglion.—Greenfield Sluder.—The writer spoke of the body of the sphenoid independent of what cell occupied it, and mentioned the close relations of the above-enumerated nerve trunks to its bony wall, and that the size of the cavernous sinus, rather than that of the sphenoid cell, was what determined some of those relationships. He spoke of the striking difference, clinically, between the nerves in the canals—maxillary and mandibular branches of the fifth and Vidian compared to the third, fourth and sixth, which run through the wide gap of the sphenoidal fissure, the former being a clinical question infinitely more often than the latter. The diagnosis was made from bone removed from the anterior part of the sphenoid sinus of 156 cases by Dr. Jonathan Wright, whose microscopic findings corresponded almost uniformly with cases clinically. The slow-growing bone increase had for its clinical history longstanding pain and often very slow progressive loss of vision, sometimes only a segment of the optic nerve being involved, the cases of violent headache and rapid loss of vision showing acute osteitis engrafted on the chronic process. The bone sometimes showed periostitis, and sometimes the mucous membrane was normal. The argument was that the clinical picture in the chronic cases arose from narrowing of the bony canals in the process of the hyperplastic bone changes, and that the optic nerve was thereby compressed in the optic canal, producing disc swelling with loss of vision. That the recurrent pain in the second division of the fifth and Vidian—usually diagnosed migraine—was explained also by narrowing of their confines. In many of the cases these headaches preceded the optic nerve troubles by many years. He attempted to explain this on the score of drainage, the lower part of the sinus usually being bathed in a small amount of thin secretion, whereas the optic and the upper part were not so. He thought the hyperplastic lesion rendered the district more vulnerable, and cited that small areas here become inflamed from unrecognisable origin, and according to their position were more or less disastrous. In the upper outer anterior aspect of the sinus, loss of vision occurred; and in the lower outer and lower middle parts great pain of maxillary and Vidian distribution, respectively. He raised the question, how lesions of this kind could be bettered by removal of bone for drainage. He did not believe that the primary blood-letting of the surgery explained it, and

cited a case in argument thereof. He stated that a similar lesion in the anterior nose, where very easily visible, was subject to recessions of longer and shorter duration, and that the condition was apparently helped by judicious surgery. The degree of hyperplasia of the plica septi seemed to be an index of the hyperplastic process in the sphenoid, whereas the degree of hyperplasia of the posterior tip of the middle turbinate seemed an index of a similar condition in the post-ethmoid.

Headaches Due to Non-suppurative Intranasal Conditions.—**George C. Stout** (Philadelphia).—Headaches of nasal origin, in which suppurative conditions are positively eliminated by macroscopic examination, transillumination, the X ray, etc., have not occupied a prominent place in our literature heretofore. But, while these headaches are found in a relatively small percentage of the cases who consult the specialist, they are of sufficiently frequent occurrence, and severe enough in their result upon the nervous and mental condition and general health of the patients, to warrant their being considered as a group by themselves.

The pain varies from occasional attacks of moderate degree to frequent seizures of intense agony. It is commonly referred to an area back of a triangle formed by the glabella, the outer canthus of the eye, and the anterior nasal spine. It may also affect the teeth, the neighbourhood of the Eustachian tubes, or ears, sometimes extending down to the shoulder. It is usually unilateral, but may be bilateral, or occur on both sides alternately. It is not increased by the use of the eyes, though sharp, shooting pains through the eyes are often present. When the pain has existed for a long period the effect upon the patient is deplorable; his general health is undermined, and his mental condition profoundly depressed.

Owing to the very slight departure from normal of the rhinoscopic picture, these cases frequently pass through many skilful hands before the true cause of the pain is recognised. A thorough routine examination of the middle turbinate fossa should, therefore, be made in all doubtful cases. All the more common causes of headache must be eliminated, such as neurasthenia, eye strain, febrile conditions, syphilis, malaria, digestive disturbances, rheumatism, etc. The absence of pus and the condition of the eye ground should be ascertained. The general appearance of the lower portion of the nose may be normal, but upon further examination it will be found that, while the middle turbinate itself may be of normal size and colouring, its cavity is narrow and compressed either by the lesser upper (or counter) deviation of the septum, or by a bilateral thickening of the upper portion of the septum, or by a split septum due to injury. Careful exsanguination of the inferior turbinates and their immediate surroundings only should accurately determine the point of contact. The exsanguination alone may so relieve the existing headache as to prove the chief localising factor of the cause of the pain.

Treatment should be directed to the middle turbinate itself, and should consist, first, in frequent applications of cocaine, adrenalin and astringents; and, second, as a last resort, the extirpation of a part, or the whole, of the middle turbinate. While the good results of the local applications may be only temporary, the operative procedure usually effects a complete cure of the pain.

Dr. CORNELIUS G. COAKLEY: I have been discouraged by the migraine type of case described by Dr. Sluder. I have, however, seen numbers of these patients, sent by ophthalmologists, with varying

conditions. In all cases there is a question whether there has been any disease in the posterior sphenoidal and ethmoidal sinuses. None of these cases present typical signs of suppurative disease. Radiographs show nothing, the sinuses always appearing perfectly normal. In most of these cases the ophthalmologist, and also the rhinologist, have gone through all the tests, excluding all the usual causes of the disease to be found in the eye. The statements which have come to me have usually been that the cause of the trouble cannot be found in the nose, and that the aetiology cannot be determined. The majority are not likely to get better without some aid. I have probed the sphenoidal sinus—which can be comparatively easily done—and have examined that portion of the sphenoidal mucous membrane which can be reached with the probe, finding it relatively normal. At the request of the ophthalmologist I have removed the middle turbinate, made a large opening in the sphenoid, and have found normal membrane. I have been astonished at the improvement in most of these cases, although the vision has been bad for two or three weeks, followed by complete recovery. I have tried to use the Holmes pharyngoscope as described by Dr. Sluder, but I do not see how he gets into the sphenoid so as to make the use of the Holmes pharyngoscope possible. I have been able to examine a little of the roof and floor, some of the posterior wall, and a little of the anterior surface. The great difficulty with all sphenoidal operations is that the orifice becomes very much contracted, so that in the course of six or eight weeks the opening is no larger than normal, and sometimes smaller. If the essayist will tell us how to make an opening that will remain, I will be obliged to him. Referring to Dr. Stout's paper, I wish merely to say that pressure against the anterior wall does give rise to these symptoms.

Dr. JOHN F. BARNHILL: We see cases over and over, such as Dr. Stout describes, in which removal of the anterior turbinate relieves the condition. Removal of tissue in the nose with no clear indication for doing so is to be deprecated. The matter of diagnosis is of the greatest importance. X-ray and blood examinations should be made, but patients will often not allow it. My greatest source of information has been from the University clinic, where we have advantage of all the channels from which information comes. Sometimes when all the lines of investigation have been followed—X-ray, ophthalmological, and blood examination—we find appendicitis. I recall three instances of that kind. We may take a line here from our friends the surgeons in the far north-west. Nose cases are going to them to-day, as well as all other classes of cases, because of the tremendous reputation they have for examining patients in every way with the one cost. When we examine them and have all the other examinations made it amounts to hundreds of dollars. Very often the trouble is not in the nose at all.

Dr. HANAU W. LOEB: The merit of Dr. Sluder's paper rests in the determining of trouble in the sphenoid cavity when no pus is present, and discovering the relation of this trouble to the cranial nerves. This is a good deal to find out in a few years. Dr. Stout's paper is also important. There are two or three points which will establish the diagnosis in these headaches—headaches in which I operate upon the middle turbinate. They are uniform in character; they attack one side of the nose, one part of the head: they last a more or less definite number of hours, then disappear; they almost invariably appear in the morning and disappear in the evening. As a rule, I refuse to operate

unless cocaine relieves them, and unless there is some marked process present. It is sometimes the case that I am surprised to find the amount of pathological process going on when there is no pus. Whether the cause is circulatory or not, I do not know. We have been able to do an immense amount of work in relieving the patient where the anterior turbinate is involved, but we have not been able to do much where the posterior sinuses are involved. Dr. Sluder's work is important in this regard.

Dr. GEORGE A. LELAND: Not the large amount of pressure, but the continuous pressure, explains some of these cases. This may be illustrated by pressing upon the skin of the hand. It requires only a short time to cause considerable pain, which may not be felt so long as the pressure is exerted, but manifests itself as soon as the pressure is removed. We have the same condition in the nose. There is a certain amount of soft tissue covering the cartilage. I have seen cases in which a little spicule of bone, sticking out from the septum and pressing upon the second turbinate, will cause pain when, during menstruation, there is an increase of pressure, or when the patient eats too much or drinks too much; and with this increased pressure there is the headache which comes under similar conditions.

Dr. WILLIAM E. CASSELBERRY: I can confirm the observations as to the total absence of pus at times. If pus in the quantity described by Dr. Coakley is considered as an indication of the presence or absence of suppurative sinusitis, I am in accord; but in other cases smaller amounts of pus may occur in one or another of the sinuses, not shown by X-ray examination. But, *ad seriatim*, taking the antrum, the sphenoid, the ethmoids, I have been able to discover an appreciable quantity of pus, or muco-pus, which amounts to the same thing. I am under the conviction that in most of these cases there is a suppurative condition which is at the bottom of the hyperplasia complained of.

Dr. JAMES E. LOGAN: I recall one case, in which the headache came periodically in the morning, stopping in the evening. The young man suffered from very extreme headache, beginning about nine o'clock in the morning and stopping about four in the afternoon. He had been operated upon for removal of a portion of the middle turbinate. The headache persisted—naso-frontal headache. I removed the rest of the middle turbinate and opened the duct, thinking pus was there. Very little pus was found. The patient suffered continuously with the headache, which gradually came later in the morning and remained later in the afternoon. Finally, by suction, I got secretion from the naso-frontal duct. This was sent to the pathologist, and it took forty-eight hours to get a culture, which showed a very faint mixed infection, with staphylococcus aureus and streptococcus. An autogenous vaccine was made from this, three injections of which were given, and the patient got well. The same course was followed in another case, and the patient was given relief. Nothing else had given relief. Such cases would seem to indicate, as Dr. Casselberry has just suggested, that the pus is there and can be found if we look for it.

Dr. EMIL MAYER: The amount of pus may be very small in these cases. I recall, in this connection, an experience at Mount Sinai Hospital. The patient, a young man, who had acromegaly, presented a history of persistent headaches. He had high temperature, muttering delirium, and choked disc, and as a result examination of his nose was exceedingly difficult, and required skilful dodging. I succeeded, however, in getting a little pus, but said I thought very little could be done

for him. The attending physician thought operation was all that could be done, and so I removed the anterior portion of the ethmoid. In twenty-four hours the headache and delirium had cleared up. Some of those in consultation thought I operated at a time when the man was in some sort of a crisis. I do not think so. I introduced a probe into the sphenoid and had an X-ray taken. The result was a perfectly clear picture of the probe in the sphenoid, and all then agreed that I was right.

Dr. OTTO T. FREER: Even very extreme conditions, where there is a sharp crest or ridge very far back in the nose, so rarely cause headache that I have become very sceptical of pressure headaches in general. The whole question is one of reflex. Where we try to remove the effect by the use of cocaine, we are just as much in the dark as we were before. This is, in fact, an open door for all sorts of experimental operations. The patient may be told that it is entirely experimental, the septum is resected, the patient is no better, and still he blames the doctor, no matter how plainly he has tried to impress that the operation is purely experimental. I agree with Dr. Casselberry about concealed suppuration, but I wish he had been a little more specific as to his method of exploring the sinus. Exploring the sinus through the natural opening is not always satisfactory. I recall a case in which the thin roof of the antrum had been perforated by the cannula, the injecting fluid injected into the orbit, and the eye put out. I do not regard washing out the antrum through the natural opening as an entirely safe procedure. The frontal sinus is still more difficult for diagnostic washing. It is sometimes by no means a trifle. In one case which I recall the patient fell over in a convulsion. The fluid could not get out through the small opening, and there was intracranial pressure. One thing that gives an indication of concealed infection is the complaint by the patient of a discharge running back into the throat. A perfectly healthy sphenoid and infundibular region usually does not go with diseased ethmoid. Something must be there to give us a hint. The nerve most often affected, in my experience, is the anterior ethmoidal, which is a very sensitive nerve, as Killian has shown.

Dr. CASSELBERRY, continuing the discussion: In a recent issue of the *LONDON JOURNAL OF LARYNGOLOGY, RHINOLOGY AND OTOTOLOGY*,¹ Brown-Kelly, of Glasgow, records no less than thirty cases of bad results from exploratory puncture by the penetration of the antrum. The one Dr. Freer mentions is the first I have heard of in an attempt to irrigate the antrum through the natural opening. When he puts in the cannula and penetrates the orbital plate he is not irrigating through the natural opening. The cannula with which I irrigate through the natural opening is very thin, reasonably thicker where I hold it, having more than a right angle turn at the bend. Properly introduced, it will serve for the irrigation of the antrum through the natural opening, which can be accomplished safely in the majority of instances. The stopcocks must be arranged and the air pressure regulated. Not more than ten pounds pressure should be used to begin with, otherwise harm will be done. This is run up as the operation proceeds. The same thing is true of all the other sinuses.

Dr. J. GORDON WILSON: Dr. Sluder's paper is extremely interesting and suggestive. It does not mean that there may not be disease of the sinuses without suppuration. That depends, of course, upon what we mean by "without suppuration." There may be hyperplasia of any sinus

¹ See *JOURN. OF LARYNGOOL., RHINOL., AND OTOL.*, vol. xxix, p. 556.

without any suppuration at all. Some years ago I did some work in the way of putting capsules into the sinus, having introduced into these capsules different forms of bacteria. The capsules were so arranged that the bacteria would not come out, but their toxins would. There was hyperplasia in these cases. I used drugs for these experiments, some of which were kept going for several weeks. I have often wondered how infection passes along these nerve trunks. I suggest, as quite possible, that there may be absorption of the toxins from the lymphatics into these nerve trunks.

Dr. SLUDER, closing the discussion: Answering Dr. Coakley's question about the method of operating: The outlet and the sinus itself must be large enough to permit of the use of the pharyngoscope. I use a right-angled knife. The posterior part of the eribriform plate and the posterior and uppermost aspect of the olfactory plate are approached, the sphenoid sinus or one of the misplaced ethmoidal cells being punctured by such a stroke. As soon as the cell is punctured the stroke is directed downward, forward and inward. The septum is cut down to the floor of the sphenoid. The knife is then introduced carefully along the eribriform plate. Again the uppermost posterior aspect of the olfactory plate is approached. The knife is then turned at an angle of 45° , and downward and outward. This, on the cadaver, has been proved to throw the posterior ethmoidal labyrinth pretty thoroughly open every time. By means of the pharyngoscope it is found that there are two very satisfactory openings into the posterior ethmoidal cell, and sometimes the sphenoidal. Sometimes it is possible to get it all out in that way. Dr. Wright has one such specimen, measuring a half inch in diameter. Dr. Coakley spoke of being unable to get good observation with the pharyngoscope. I always operate under cocaine. I uniformly refuse to operate upon these patients except under cocaine. I give them scopolamine first. The primary stroke is sufficient to produce enough shock, and at the same time to prevent the wound from bleeding. With the pharyngoscope close at hand it can be passed in. The patient may faint; let him faint. The wound for a time does not bleed. I have some cases in which the opening stayed open for five or six years. I have never seen membranous closure, as suggested by Dr. Bryan, but I have seen bony closure, as suggested by Dr. Coakley. Dr. Loeb spoke of congestion in the sinus, which he thought more responsible than the vacuum of which I spoke. Politzerisation will stop the trouble. The congestion is the result of the vacuum. I have tried vaccines repeatedly, as suggested by Dr. Logan, but have not got the results. Dr. Mayer spoke of crises and the use of ergot. In my text I brought out, partly as a matter of speculation, that there is in some canals a considerable pad of fat; in the optic canal there is exceedingly little. If this hyperplastic process narrows the canal, and this pressure is maintained for a considerable time, Nature's shock absorber is used up. Sometimes a trifling indigestion will start up the trouble, just as sometimes a trifling thing will diminish the vision. If ergot is given when there is this congestion, it will contract the tissues and relieve the headache.

(To be continued.)

Abstracts.

EAR.

Mulholland, J. A.—Infection of the Ear with Vincent's Micro-organisms: Report of sixteen cases. "Annals of Otology," xxiv, p. 485.

The points about this infection are: (1) The fact of its occurrence in debilitated children, (2) its apparent contagiousness, (3) its amenability to local treatment, and (4) its good prognosis. Of the 16 cases, 13 were confined to the middle ear, 3 had mastoiditis (2 of which were inoperable and died of meningitis; both had complete facial paralysis). General treatment was symptomatic. In the last 4 cases salvarsan was used (in one case syphilis was excluded by Wassermann examination).

Macleod Yearsley.

Shambaugh, Geo. F.—Focal Infection in the Ætiology of Labyrinth Disease. "Annals of Otology," xxiv, p. 481.

Discusses a group of cases of labyrinth disease in patients without middle trouble or general disease to account for it. The disturbance may be in cochlea, vestibule, or both, and the symptoms in the former case are nerve deafness, usually with tinnitus. Progress takes place by acute exacerbations. In the vestibule, disturbed equilibrium occurs, except in cases where the vestibular involvement is very insidious. Involvement of the whole labyrinth gives rise to Menière's complex, unless progress is without acute exacerbations, when deafness and tinnitus alone occur. The clinical picture in this group of cases, therefore, differs very widely. It is to ætiology that Shambaugh calls attention. He points to the similarity between the phenomena in these cases and the chronic degenerations which occur as the result of focal infections. Chronic arthritis and neuritis, chronic cardio-vascular degenerations, and chronic nephritis are the result frequently of chronic latent foci of infection. In all these systemic diseases there is the chronic progressive character punctuated by acute exacerbations, accounted for by fresh bacterial emboli. In the cases under discussion the target for these emboli is the labyrinth. The focus for these systemic infections is usually found in faucial tonsils or teeth. Histories are given of three typical cases. A very important and instructive paper.

Macleod Yearsley.

ŒSOPHAGUS.

Arrowsmith, H.—Angi-neurotic Œdema of the Œsophagus. "Laryngoscope," 1915, p. 156.

The patient was a female, aged fifty, who was first seen by Arrowsmith in 1911. At that time she had suffered for several weeks from increasing dysphagia and odynphagia. On œsophagoscopy, Arrowsmith found a mass just below the level of the cricoid cartilage occupying two-thirds of the lumen of the œsophagus, and attached to the left wall. The Wassermann reaction was negative, and a diagnosis of probable malignancy was made. The patient wanted a second opinion, and so a second examination was made by Jackson under general anæsthesia. On this occasion no lesion was found. Jackson's diagnosis was that of spasmodic stricture of the gullet. It subsequently transpired that the patient had suffered

from frequent and painful micturition, vesical tenesmus, gastro-intestinal disturbance, pyloric spasm, etc. She had also had œdema of the larynx, and had obtained relief by large doses of morphia and atropin. As might be expected, the patient also suffered from colon stasis, and an X-ray showed adhesions about the hepatic flexure. In 1913 the dysphagia returned, and at this time cutaneous wheals appeared on the neck. Arrow-smith holds that what he observed through the œsophagoscope in 1911 was a localised angio-neurotic œdema.

J. S. Fraser.

MISCELLANEOUS.

Evans, J. S., Middleton, W. S., and Smith, A. J.—Tonsillar Endamœbiasis and Thyroid Disturbances. "Amer. Journ. Med. Sci.," February, 1916.

Following upon the work of McCarrison, Farrant, and others, there has recently become evident a tendency to regard endemic goitre as due to an infective agent. While in no sense wishing to be understood as advancing such an explanation in reference to all cases of goitre, the writers of this paper regard it as probable that some of them are due to an effect on the thyroid gland of toxins elaborated in the tonsils or some other part of the upper respiratory tract, as a result of the symbiosis of the *Endameba gingivalis* with certain bacteria, notably the *Micrococcus catarrhalis*, the protozoon being supposed to produce, by proteolysis of various cells, a pabulum of special value for the nutrition and growth of those bacteria whose toxins, according to Farrant, possess the power of thyroid stimulation. Of 362 goitrous persons examined, 22·8 per cent. showed infective conditions of the tonsillar crypts, and 90 per cent. showed lesions of either the tonsils or the nasal passages. Of 34 cases with diseased tonsils examined microscopically, 97 per cent. were found to harbour the *Endameba gingivalis* in the tonsillar crypts. Of 16 individuals of this group who, after treatment by means of emetin hydrochloride, were re-examined, 13, or 81 per cent., were found no longer to have amœbæ in the tonsil crypts. Further, in 18 of 23 persons to whom emetin was administered, a definite reduction in the size of the goitre took place, the improvement being most constant in the dysthyroid cases, in 6 out of 7 of whom varying degrees of benefit were observed, from slight amelioration to apparent cure.

Thomas Guthrie.

NOTES AND QUERIES.

THE ROYAL SOCIETY OF MEDICINE.—SECTION OF OTOTOLOGY.

It has been arranged to hold a special discussion on "Warfare Injuries and Neuroses of Otological Interest" on Friday, February 16, 1917, at 5 p.m. This early notice is given in the hope that those interested will prepare reports of cases to submit to the meeting, and will send full particulars of them not later than November 30 to Mr. E. D. D. Davis, 81, Harley Street, W. The council hope that if they receive sufficient material they will be able to classify and group the cases, as this should add to the value of the discussion; and it is therefore suggested that those sending in cases should later on send a further report on the progress of the cases; these additional reports should be received before the middle of January. Pathological notes of any fatal cases will, we understand, be considered extremely valuable.

THE
JOURNAL OF LARYNGOLOGY,
RHINOLOGY AND OTOTOLOGY.

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**CENTRALLY CAUSED BILATERAL LARYNGEAL ABDUCTOR
PARALYSIS IN TABES, WITH A REPORT OF THE POST-
MORTEM EXAMINATION.¹**

By EDWARD D. D. DAVIS, F.R.C.S.Eng.

Assistant Surgeon, Nose, Throat, and Ear Department, Charing Cross Hospital, etc.

At a discussion on the aetiology of paralysis of the recurrent laryngeal nerve held by the Laryngological Section of the Royal Society of Medicine on May 2, 1913, Sir David Ferrier stated:² "Taking all the facts into consideration, and pending further precise examination of the recurrent laryngeal nerves and their motor nuclei, I am inclined to adopt the view already expressed by many eminent laryngologists and neuropathologists—*e. g.* Cahn, Dejerine and Petren, Oppenheim, etc.—that the recurrent laryngeal paralysis usually observable in tabes is of peripheral origin.

This generalisation was strongly opposed by Sir Felix Semon, in whose opinion that question was still quite open. The partisans of the exclusively peripheral theory had either ignored older carefully observed cases such as his own, in which the nucleus ambiguus had been found degenerated, or had attempted to explain them away by maintaining that the medullary degeneration must be of a secondary nature—a statement which so far had been neither proven nor disproven.

¹ See also p. 381 of this issue.

² See JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxviii, 1913, p. 652.

Furthermore he could not understand why, as in the analogous case of the oculo-motor paralysis of tabes, the original lesion might not be as well of a central as of a peripheral origin, and he would ask, why, if it were always peripheral, bilateral abductor paralysis should be so frequently observed?

In the course of his observations Sir Felix Semon made the following remark: "Altogether the number of reliable *post-mortem* examinations, by which alone this question could be decided, was at present much too small for that purpose, and he would exhort the members of the Section not to let a single opportunity slip to increase our knowledge of the subject, carefully examining in every case of tabes accompanied by laryngeal phenomena which ended fatally, whilst under their observation, all the parts in question from the nucleus ambiguus downwards."

It is in compliance with this exhortation that the *post-mortem* results of the following case, which was under my observation for six years, are being given in full in the following report. It would be beyond the scope of this paper to enter upon the very extensive literature on this subject. I let the facts speak for themselves:

A cabman, aged thirty-six, was shown at the Laryngological Section on March 29, 1912. He first attended the hospital in May, 1909, complaining of difficulty in breathing of eleven months' duration.

About twice a week he would suddenly jump out of bed, make a crowing noise, and would be unable to breathe. The attack lasted a few seconds. He was short of breath on exertion, and breathing was occasionally stridulous.

He contracted syphilis in 1903.

The patient was admitted under Dr. Mott for observation for ten days, and the diagnosis of tabes was confirmed.

On examination of the larynx the vocal cords were in a position of complete adduction. During deep inspiration there was scarcely any abduction, but there was a narrow chink in front and behind the vocal processes. The condition of the larynx remained precisely the same for six years until his death in April, 1915.

The pulse was frequent and feeble, 120.

The pupils were unequal and did not react to light; optic discs normal. Knee-jerks present, lightning pains, difficulty of micturition. Wassermann reaction positive on two occasions. Gait normal. He refused tracheotomy, and drove a cab until a day or two before his death.

He was readmitted to hospital for laryngeal crises on the night of April 1st, 1915. He was restless, but not cyanosed, and in the intervals breathing was not worse than it had been before the onset of the laryngeal crises. He was given a hypodermic injection of morphia gr. $\frac{1}{6}$, atropine gr. $\frac{1}{100}$, which was repeated six hours later. At 4 a.m. I was asked to see him, and did an immediate tracheotomy, but he died half an hour later.

A *post-mortem* examination was made six hours after death. The patient was poorly developed. Scars of syphilis were present. The vocal cords were in the

cadaveric position, and there was no sign of inflammatory or other disease of the pharynx, larynx, or trachea. The viscera were normal.

The skull, meninges, brain, spinal cord, and vagus nerves were to outward appearance normal, and were sent to Claybury for examination by Dr. Mott.

Sections of the medulla were cut, and a preliminary incomplete examination was made a year ago by Dr. Lena Beach, of Iowa, U.S.A.

The specimens and material were handed over by Dr. Mott to Dr. F. Sano, who made the following report, with which Dr. Mott agreed:

The lumbar spinal cord shows sclerosis of the posterior columns, except in the deepest part, near the posterior commissure (Schültze's comma-tract). The posterior nerve roots show more



FIG. 1.—Motor cells in chromolysis (nucleus ambiguus). (Preparation by Dr. Beach.)

atrophy, but there is no thickening of the meninges, no indications of either a recent or old inflammatory condition, and the arteries are not atheromatous.

The cells of the anterior horns are in good condition, with the exception of some single cells, which have an eccentric nucleus and a lack of Nissl blocks. But this condition is very rare. The anterior nerve roots have a normal appearance.

The cells of Clarke's column are not quite normal, some of them being atrophic or show an eccentric nucleus.

A careful examination reveals a slight increase of neuroglia in the cortico-spinal (pyramidal) tract, and this corresponds with slight atrophy of the tract.

The importance of these observations is evident, for they prove that the case was one of tabes. Nevertheless, the knee-jerks were present, but the slight atrophic process of the pyramidal tract lends support to the explanation of the unusual persistence of the tendon reflexes by the weakness of the inhibitory influence of the cerebral cortex.

In the cervical cord the posterior sclerosis is limited to the fasciculus gracilis (Goll), but there is a slight atrophy of the pyramidal tract. No other abnormal conditions were observed, and, as a matter of fact, the lesions found here have their origin far away from the cervical cord, and are of exogenous origin. There are no indications of inflammation.

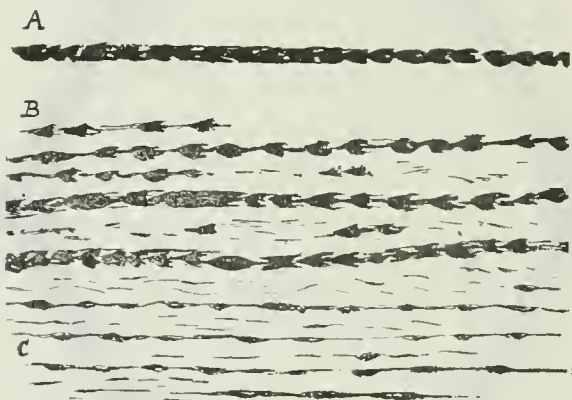


FIG. 2.—Vagus nerve. A. Normal myelinised fibre. B. Fibres with poor myelinisation. C. Sympathetic fibres.

In the medulla the sclerotic lesions are followed with difficulty, although it appears that the fillet is smaller than natural, but the pathological change which existed in the spinal cord as a sporadic and exceptional condition of the anterior horn-cells is very marked in the nucleus ambiguus, the motor nucleus of the three mixed bulbar nerves (ninth, tenth, eleventh)—*i. e.* glosso-pharyngeal, vagus, and spiral accessory.

A considerable number of the cells of this nucleus are atrophied, and others show an eccentric nucleus with a lack of Nissl blocks. Again there is no indication of inflammation either around the cells, or in the meninges, or in the nerve roots of the ninth, tenth, and eleventh pairs of nerves.

The vagus nerve shows evident atrophy, with a lack of myelinated fibres, but without increase of connective tissue.

The optic nerve shows an increase of interstitial tissue, and it is suggested that the pathological pupillary signs may have been partially caused by the optic atrophy.

The cerebral cortex has been examined and a bilateral change in the central convolutions were found. In the precentral gyrus some of the Betz cells are atrophied, and have an eccentric nucleus, with loss of Nissl blocks. On the other hand, the post-central gyrus in some places shows a complete loss of the normal arrangement, in others reduction in the number of subgranular pyramidal cells.

The conditions observed in the post-central gyrus have been demonstrated by Campbell in tabes cases. The atrophy of the



FIG. 3.—Section of the posticus (abductor) muscle. A. Thin fibres of the atrophic muscle. B. Swollen fibre with loss of striation and increase of nuclei. C. Normal fibre of the other muscles. (Sketch.)

Betz cells without either marked increase of neuroglia or thickening of the meninges is a lesion occasionally found in tabes and invariably in sclerosis lateralis amyotrophica, which in a number of cases is undoubtedly syphilitic in origin.

The case under examination, therefore, should be regarded as an unusual case of degeneration or atrophy of the afferent and efferent systems of neurons.

This degenerative atrophy proves the case to be one of amyotrophic tabes (also called combined sclerosis). The slow progress of the atrophic process is of importance, and the fatal issue was due more to its dangerous localisation than to its real extension.

Attention is also called to the effect that there was nothing but an atrophic lesion observed.

The larynx was dissected by the author. The mucosa, the vocal cords, the cartilages and joints were normal. The adductor muscles were fully developed, but the crico-arytenoidens posticus or abductor muscles were atrophied, and comparison made with the muscles of a normal larynx obtained from a subject who had been killed by an accident emphasised the atrophy.

In the normal subject the recurrent laryngeal nerve-fibres to the posticus muscles were well developed and easily found, but in this case of abductor paralysis the nerves to the postici could not be demonstrated.

Microscopical sections of the posticus muscles examined by Dr. Sano showed a very evident atrophic condition. Some fibres are swollen, and have lost the transverse striation, and their nuclei are increased. Sections of the adductor muscles were normal, and no abnormality could be found in these muscles.

The larynx and its muscles, the vagus nerves, the spinal cord, medulla, and cerebral cortex were all carefully examined. Unfortunately the recurrent laryngeal nerves were lost, but the pathological specimens in this case indisputably show that the lesion was of central origin, and there was nothing to indicate a primarily peripheral degeneration. The case, therefore, is strong evidence in favour of Semon's law.

The specimens do not throw any light on the causes of the crises. Their occurrence is in conformity with the theoretical explanation given by Sir Felix Semon in 1892, viz. that whilst the medullary nuclei of the abductors are the first to succumb to gradually destructive processes, the ganglionic centres of the adductors are in a condition of latent increased irritability and react more promptly and more intensely upon reflex and peripheral irritation. In addition to this, as Burger has suggested, there is probably increased irritability in the sensitive sphere.

Unfortunately, spraying of the larynx with cocaine, the benefit of which has been observed by several authors (Gerhardt, Landgraf, Krause, etc.), was not employed during the crises in this case.

Attention has been called by Dr. Watson Williams and others to the frequency (120) and feebleness of the pulse, which may be ascribed to an extension of the atrophy of the circulatory centre.

The author is indebted to Dr. Sano for the pathological investigations which form the most important part of this communication.

EPIDEMIC NASAL SINUS DISEASE.¹

BY JOHN J. KYLE, B.S., M.D.,

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Los Angeles, California.

DURING the past winter an infectious disease of the nasal and lower air-passages, and designated influenza or *la grippe*, spread from the Atlantic to the Pacific. The infection was not confined to any one specific organism, nor was the Pfeiffer bacillus found in our few cases. The pathology of so-called *la grippe*, we believe, varies in individuals, though general symptoms are much alike. The mucous membrane of the nose, throat, ear, and lower air-passages was more or less involved, and the sinuses of the nose more often than the middle ear or mastoid process. During epidemics of this character the local and general symptoms are more pronounced than in seasons when isolated cases are observed. Pus apparently does not always form in the sinuses. Local symptoms, however, are quite the same. The character of the exudation found in the sinuses during epidemics of influenza may vary, and may be a clear mucus, muco-pus, or pus. In a few cases the sinus may apparently contain no secretion, and we have a negative pressure which is as acutely painful as though pus were present. Mucous discharge from the nose, as a rule, contains bacteria the same as pus. In a few cases it will be almost impossible, however, to isolate the bacteria, and one will try day after day to discover the organism.

Many cases of epidemic sinus infection are probably acute exacerbations of some old sinus disease. In the great majority of cases of catarrhal discharge from the nose or naso-pharynx, one or all of the sinuses are involved.

In Southern California sinus diseases are more prevalent during the winter months, and, independent of epidemics of influenza, are due, first, to amount of rainfall, variable daily temperature, and to spread of infection from one individual to another. In the spring and summer months there is a fine dust in the atmosphere, which is irritating to the nasal mucosa and causes a great deal of sneezing and consequent trophic changes in the nasal mucosa.

Sinus disease has a tendency under seasonable conditions and from sporadic cases to become epidemic. Epidemics of this

¹ Read before the Pacific Coast Ophthalmological and Oto-Laryngological Society, Portland, Oregon, June 22-24, 1916.

character are self-limited and run a short course, leaving here and there a few cases that resist other than surgical measures.

Climatic conditions are such in the United States as to predispose to catarrhal affections of the upper respiratory tract, and limited more particularly to one or more of the nasal sinuses. Most adults in the United States have an unnatural discharge into the post-nasal space. Oriental races do not, as far as our limited observation goes, suffer as we in this country do from sinus discharges.

Indiscriminate expectorating in public places is probably the most active cause of the spread of catarrhal affections of the upper air-passages. In highly populated districts the prevailing winds may carry bacteria from drying stagnant pools, excreta, and decaying vegetable and animal bodies. Pathogenic bacteria are not infrequently found as habitats of the soil, and especially about gardens, stables, and the superficial layers of the soil. Wind and drying water are the great purveyors of respiratory diseases.

The maxillary sinus at birth is supposed to be a small slit not much larger than a split bean, and about the second dentition begins to grow very rapidly. The maxillary antrum may grow out of all proportion, and at the beginning of the second dentition may approximate the adult antrum.

The frontal cells begin their formation at birth by a process of evagination of the nasal mucous membrane at the superior extension of the unciform groove. There is an uncertainty about the development of the frontal cells. Partial or total absence of one or both cells now and then occurs. They are seldom alike in size, and infection is usually monolateral. After second dentition the frontals grow rapidly to mature size.

The ethmoids begin their growth also at birth. At birth the ethmoid body is supposed to be a soft cartilaginous mass, with a predisposition to absorption and formation of cavities. These cavities reach their full development at about puberty.

The sphenoid, like the frontal and ethmoid, begins its formation by a process of absorption, and about the second or third year shows distinctly. Sphenoid cells do not always develop. I have seen cases in which only a small superficial cupping existed to mark the sinus. The sphenoid may run riot in its development, and when once diseased is difficult to cure.

In children and adults there are certain predisposing factors to infection of the sinuses, and spread of infection to deeper structures, such as the orbital cavity and brain.

Dr. G. Gordon Wilson (*The Laryngoscope*, December, 1915), in a discussion of "The *Ætiology of Pansinusitis*," makes the following statement, that "no sinus inflammation can occur unless the physiological activity of the sinus be disturbed or destroyed." What, then, are the predisposing factors to infection of one or more of the nasal sinuses?

The sinuses drain in the direction of least resistance, with the exception of the maxillary, and it is questionable if the maxillary is not drained as satisfactorily by the natural osteum as it would be by an opening at the bottom or most dependent part of the cavity.

The sinuses are lined with a mucus-secreting ciliated epithelium and with blood and lymph supply, and are thus nourished, moistened, and drained sufficiently to prevent the growth of bacteria, and in health are supposed to be free from bacteria.

Predisposing factors to disease of the sinus are probably external to the sinus, and are due frequently to congenital narrowing of the attic of the nose and sometimes diseased septum. With the growth of the nasal cavity, such deformities may prevent the development of the sinuses or obstruct their normal drainage.

Diseased tonsils and adenoids, exanthematous diseases, and recurrent attacks of coryza are important factors in producing a thickening of the nasal mucosa about the sinus openings. The nasal septum is prone to deformity and to inflammation of the septum, mucoperichondrium, and mucoperiosteum. The septum may become so thick, high up, as to crush the turbinate against the ethmoid bodies, and by so doing prevent drainage from the ethmoid or frontal sinuses. A negative or positive pressure alike predispose to destruction of ciliated cells and subsequent infection.

Syphilis and tuberculosis, either acquired or congenital, predispose to suppuration of nasal sinuses.

I do not know that habit or occupation play a special part in sinus disease. The middle-aged are more prone to the disease than the young or old, and women more often than men. Climatic or geographical locations probably predispose to the disease. In the east, superheated office buildings, slush and rain predispose to sinus disease. In the far west, quick changes of temperature during the day, cool nights, and morning humidity of the atmosphere tend to vascular changes in the nose with swelling of the mucosa. In Southern California, the Land of Sunshine, we treat an unusual number of acute and chronic sinus diseases. Many cases contract the disease elsewhere, and come to this country on account of the

climate. To this extent they are disappointed. Change of climate will not cure a purulent sinus disease. Many cases have been diagnosed as a tuberculosis of the nose, and are referred as such to a warm climate. Tuberculosis of the nose or sinus, as a disease *à priori*, is a rare one, and to call a discharging nose tubercular in the absence of marked phthisis pulmonalis, is to go far astray.

The tubercle bacillus, as far as we are able to discover, has no disposition to inhabit the nasal or accessory cavities. In an ozænatous nose an acid-fast bacillus, possibly related to the tubercle bacilli, is not infrequently found. In typical acute purulent infections, however, of the sinuses it is seldom found.

During epidemics of so-called influenza there is no one organism that stands alone as the exciting cause. During such epidemics the metabolism of many individuals is lowered and the vaso-motor system altered by some peculiar predisposing atmospheric condition. Infection is carried from one individual to another, and those organisms present in the nose take on new virulence with the establishment of a true epidemic of the respiratory affections.

In the light of present biological investigations it would seem that an artificial immunisation by the use of vaccines or serums is the best assurance against acute sinus infection during epidemics of so-called influenza. This, however, will not apply in all cases, and especially in those cases in which free drainage from the sinuses is prevented by intranasal deformities. A nose in which the septum is narrow and vertical, middle turbinates that are small and normal in colour when compared with adjacent mucosa, not in contact with either the septum or lateral wall of the nose, should respond to vaccine immunisation.

The character of infection of the nose in acute or chronic cases in epidemics of so-called influenza varies in individuals.

Text-books usually enumerate three or four organisms as the usual cause of acute or chronic suppuration in the nasal sinuses. This number must be multiplied a number of times. The bacteriology of sinus disease must be worked out by the physician in individual cases. Thus the future of our work for a time must be with the microscope as well as the punch forceps. We do not pose as expert bacteriologists, and when in doubt have submitted our findings for verification to men who profess to be experts. Our vaccines, with the exception of the commercial vaccines, were also prepared by professional bacteriologists.

In securing mucus, mucopus, or pus from the nasal cavity care

must be taken that the sample does not become contaminated with secretions from the mouth.

In acute or chronic diseased sinus frequently the organism is limited to one variety, while in some cases we may have a mixed infection. A slide examination is unsatisfactory, and to secure positive findings a culture must be grown. From this the autogenous vaccine may be made.

In the diagnosis of sinus suppuration the X ray must play a very important part. In many cases diagnosis by direct inspection is easy, and in others distinctly difficult. It may, however, be impossible to tell in a given case, even when we detect pus in the nasal cavity, whether it is from the frontal, the ethmoid, or the maxillary sinus. I have great faith in simple transillumination in maxillary and frontal sinus disease, yet this method is uncertain. In one case not long ago there was apparently perfect transillumination and normal pupillary reflexes, yet one antrum was full of pus, necessitating a radical operation.

In many chronic cases of hyperplastic changes in the sinus walls transillumination is unsatisfactory. Therefore puncture and lavage is the most satisfactory way to diagnose the presence of pus in the maxillary sinns.

In many cases of purulent sinus disease the frontal is also diseased, and antedated the maxillary affection.

For diagnosis of ethmoid sinus disease the X ray is most satisfactory, and eminently so when the infection is confined to one side.

An acute sinus infection, like an acute infection of the ear, provided that the nasal drainage is completely obstructed and that the organism is virulent in character, usually the streptococcus, spreads in the direction of least resistance, and thus the eye is first involved and then the brain. In some cases of meningitis it may be that symptoms do not point to the nose, unless at the same time there is some involvement of the eye. A pain sudden in its origin and in the frontal, orbital, and temple region, with or without temperature, should be looked upon as indicative of sinus disease; likewise unilateral or frontal headache, with slight temperature. There is usually a prodromal stage to infection of the brain structures, and it is in this period of time that one must eliminate sinus suppuration.

An acute sinus suppuration may come on suddenly and with few localised symptoms. The temperature may go as high as 105° F.; there may be delirium, rigidity of neck muscles, and

convulsions. These cases are sometimes presumed to be, in the beginning, typhoid fever or meningitis. Unless by some happy chance the surgeon detects pus in the nasal cavity, the case may pass for a hopeless one of meningitis. In the early stage of delirium, spinal puncture is indicated, not alone to discover the character and extent of infection, but to relieve intracranial pressure.

The variety of organisms in acute epidemic sinus disease varies in individual cases, and the following gives a very good conception of the flora found in the great majority of cases of acute and sub-acute infections.

In about fifty cases of acute infection of the maxillary sinus, during the past winter, we found in twenty the *Staphylococcus albus* or *citreus* as the sole organism. In one case we found the *Bacillus pyocyaneus* and the pneumococcus mixed. A few weeks after the recovery of this patient he returned with a *Staphylococcus albus* infection on the opposite side. In one case of unilateral infection we found the *Bacillus pyocyaneus* in pure culture. In one case we found the *Micrococcus tetragenus* in pure culture. In only one case did we find the streptococcus, and in one case the *Micrococcus catarrhalis* alone. In the case of *Micrococcus catarrhalis* infection we did a radical intranasal operation, and a few days afterwards no *Micrococcus catarrhalis* could be found, but many staphylococci were present.

Transmission or change of infection not infrequently takes place in some of the sinus cases very quickly, and frequently a bacteriological examination of secretions before and after operation is indicated, provided we care to supplement our treatment by vaccines. The *Bacillus pyocyaneus* is a very frequent inhabitant of the nasal accessory sinuses. Vaccines act very satisfactorily, either stock or autogenous.

In one case of acute exacerbation of maxillary sinus disease we found the *Bacillus prodigiosus* mixed with the staphylococcus.

In thirty-two unselected cases of suppuration of the ethmoid sinus we found the following:

- Bacillus coli* mixed with the diphtheroid and staphylococcus, 2.
- Staphylococcus*, 11.
- Streptococcus pyogenes*, 2.
- Pneumococcus*, 1.
- Friedländer's, 6.
- Bacillus pyocyaneus*, 8.
- Micrococcus catarrhalis*, 2.
- Bacillus prodigiosus*, 1.

We found in a few cases an organism resembling the bacillus of Perez. These were cases of established ozaena. We are not in a position to make any comments relative to the bacillus of Perez as an aetiological factor in ozaena.

We have experimented with stock and autogenous vaccines, but our results have not been satisfactory. This is not said to cast any reflection on the value of the vaccines recommended for the relief of ozaena, for the reason that we have not had sufficient data to enable us to arrive at any specific conclusions.

The organisms most frequently found by us as the cause of subacute and acute suppuration of the ethmoids are the staphylococcus and the *Bacillus pyocyaneus*. Infections of the frontal sinuses are not as frequent as the maxillary or the ethmoid. In a few of the cases we found Friedländer's bacillus alone, *Streptococcus mucosus* and *Staphylococcus albus* in combination, the *Bacillus pyocaneus* alone, and the *Staphylococcus pyogenes albus* alone. We had during the past winter one case of meningitis from *Staphylococcus albus* infection of the frontal. We had also one case of meningitis from rupture of the ethmoid into the orbital cavity and thence to the cavernous sinus, and ending in purulent meningitis.

These cases that I have enumerated above are those that occurred within a short period of time and during the epidemic of what is commonly called *grippe*. In consequence of this, and the fact that severe purulent infections of the upper air-passages occur with singular periodicity, it is no more than natural to classify and tabulate cases of this character as belonging to the epidemic type.

In regard to the use of vaccines in the treatment of epidemic sinus diseases, we have a natural hesitancy in expressing any positive opinion. The use of commercial vaccines, polyvalent and mixed, has become universal in the United States, and we have no doubt but what in many cases their value as a therapeutic remedy is at least worth a trial. There are times when it is almost impossible to secure an autogenous vaccine.

Dr. Hektoen, in a recent communication to *The Journal of the American Medical Association*, says:

"If the presentations in this paper are trustworthy, it may be concluded that the general results so far from the routine use of commercial vaccines, polyvalent and mixed, have no value as evidence for or against the curative usefulness of vaccine treatment, and hence no value, either, with respect to the soundness of the theory on which vaccine treatment primarily has been developed.

"In subacute and chronic localised infections, the results appear

to indicate that specific vaccines properly and skilfully used have value, quite likely because they increase the production of specific anti-bodies, as demanded by the theory, but probably also because they stimulate leukocytic and other activities."

We are anxious in our cases to find the cause of the infection, or at least the predominant organism, and, where the opportunity presents, we have an autogenous vaccine prepared. But in many cases for want of time we have relied upon the stock vaccines. As far as we are able to judge, our results are just as satisfactory as when we use autogenous vaccine. The good results of the use of vaccines are sometimes rather remarkable. In infection from the pyocaneus bacillus the specific vaccine has been of value. Stock vaccines in streptococcus and staphylococcus infections have worked very well for us. It is almost a waste of time and criminal to prescribe stock vaccines unless we know something positive of the character of the infection and the vaccines are of the kind shown by the microscope.

Many of the cases are acute exacerbations of old chronic cases, and in consequence vaccines given in acute cases of this character have a tendency to restore the immunity of the individual. After all, free drainage in sinus diseases is the first thing to be thought of and secured by local medication or surgical measures.

WAR DEAFNESS FROM LESION OF THE INTERNAL EAR.¹

BY DR. GOT.

Ancien Interne des Hôpitaux de Bordeaux.

Translated by MACLEOD YEARSLEY, F.R.C.S.,

Senior Surgeon to the Royal Ear Hospital, etc.

ON two different occasions already, and especially in an article which appeared in the *Gazette hebdomadaire des Sciences Médicales de Bordeaux* (July 4, 1915), have we published observations which suggested to us the study of "the war labyrinth." We consider it of value now to bring forward new light on the question, which is of the greatest interest at the present juncture.

Etiology.—In the great majority of cases the injury of the internal ear is caused consecutively to the bursting of a shell in the immediate neighbourhood of the patient. The distance between the ear and the shell is always less than two or three mètres, five

¹ From the *Revue de Laryngologie, d'Otologie, et de Rhinologie*, January 15, 1916.

at the most: it must be admitted that beyond that distance the ear resists the aerial concussion, or that the resulting labyrinthine disturbance is slight and likely to disappear rapidly.

In other cases the internal ear is injured directly or by bone transmission due to a bullet or shell-splinter wound on the corresponding side. The nearer this wound is to the petrous, the more serious is the lesion of the internal ear, all conditions being equal in other respects, and, where the injury fractures the petrous itself, destructive troubles are observed, sometimes absolute, of the perceptive organ involved.

We wrote, in July, that these direct injuries of the head involved, in principle, more serious ear troubles than the "wind" of the shell. Since then we have modified our opinion on this point, having proved, on the one hand, deep wounds of the head without labyrinthine involvement, and, on the other, serious labyrinthine disturbances by "shell wind." Therefore it is correct to note both ætiological facts, but to give preponderance to one or the other systematically.

A question that suggests itself in connection with the ætiology of "war labyrinthitis" is: Who are the subjects most frequently attacked? Are they individuals who possessed healthy ears before the war, or those who started with defective ears? Certain it is that both may get labyrinthine lesions: very often, in fact, on the patients' cards may be seen a diagnosis of middle ear followed by the expression "with implication of the internal ear." But often also is read "labyrinthine disturbance, without objective lesions of the tympana." This can be understood on reflection that in similar cases the ætiological factor of much more importance is incontestably the distance from the ear at which the shell burst, or the violence of the direct injury which struck it. Nevertheless, it appears—and this confirms the opinion expressed by Lermoyez in his article in the *Presse Médicale* (February 25, 1915)—that the patients starting with healthy ears are more often injured in their labyrinth than those starting with defective ears. Here, in fact, are the statistics of the otological centre of the Eighteenth Region, concerning this class of case, to the number of 283:

(a) Traumatic labyrinthitis without objective lesions of the middle ear, 144, say 50·88 per cent.

(b) Traumatic labyrinthitis with defects of the middle ear arising at the same time as the disturbance, 74, say 26·14 per cent.

(c) Traumatic labyrinthitis with defects of the middle ear

antecedent to the war, 65, say 22·96 per cent. The first two groups should be taken together, giving 218, say 77·0 per cent.

Nevertheless, it must be pointed out that many of the aural defects anterior to the war have not gone under fire, which vitiates results.

Pathological Anatomy.—As in our first notes, we can only formulate hypotheses, especially seeing the clinical variety of the cases observed. In the slighter forms—the only ones which really can be catalogued as “labyrinthine disturbances”—it is doubtless solely a question of concussion of the higher organs of the internal ear, due to shock produced by the sudden displacement or compression of the extra- and the intra-labyrinthine fluids. But in the serious forms—traumatic labyrinthites—it is probable that they are produced in the cochlea and the vestibule by hæmorrhages more or less important, accompanied by detachment and disintegration of the membrane of Corti.

Two considerations plead in favour of this hypothesis. To begin with, the fact that these supposititious lesions of the ear will be homologous to those which ophthalmologists demonstrate in the eye, this organ having the advantage of lending itself to direct exploration (retinal detachments, tears of the choroid, &c.); and also the clinical possibility of homologising the “war labyrinths” those “peace labyrinths,” which are the Ménière cases, and of cataloguing them, at one swoop, under the same heading of “labyrinthorrhagies.”

Symptomatology. — Patients are very unequally affected. According to the distance at which the shell bursts, and according as the deflagration is produced to their right or left, in front or behind, one or both ears are affected.

The predominant symptom is the deafness or the more or less marked diminution of the auditory acuity. This deafness progresses in different ways. Often it diminishes in the weeks that follow, but it may possibly be seen to persist without modification for months, and probably in some cases it remains incurable. *On the other hand, we have never seen it increase.*

This deafness is always of the labyrinthine type, that is to say, there is abolition of the cranial perception to the watch, abolition or considerable diminution of aerial perception, diminution of the auditory acuity more marked for high than for low sounds, for the whispered than for spoken voice. Rinne positive or barely negative; lateralisation of Weber's test to the sound or less affected side.

The second important symptom—and one which causes lively trouble to the patient—is tinnitus, of variable type. It does not leave its victim for one minute, and sometimes prevents him from fixing his attention.

Finally—the third element of the classical symptom triad—there is vertigo, sometimes to the degree of falling, the disagreeable character of which generally disappears fairly quickly.

Another extremely important symptom is spontaneous nystagmus. We do not, in fact, consider that it would be possible to establish the diagnosis of “traumatic labyrinthitis” without the presence of this symptom, at least when the lesion dates under several months. In the great majority of cases its direction is to the sound side, or to the side less affected (unless with complete destruction of the labyrinth, in which case the formula is inverted).

Finally, disturbances of equilibration occur, but it must be thoroughly understood that of all labyrinth disorders these will disappear at the end of several weeks, and always are the first to go; consequently they are not seen in slight forms of disturbance nor in labyrinthites of long duration.

We come here to this capital fact, to which Prof. Moure has often called our attention in connection with cases of Ménière's disease examined in times of peace: in the evolution of a coarse labyrinthine lesion, hæmorrhagic in type, the vertigo is the first symptom of the tripod to improve and disappears with time; and when the crises of equilibrium disturbances are sufficiently violent and sufficiently long in duration to end in nausea or vomiting, it is this trouble which first diminishes and ceases, then the vertigo. Then in this kind of old labyrinths are often observed simple crises of tinnitus (Moure).

In these old forms it will be generally useful, in order to fix an uncertain diagnosis, to study the modifications of induced nystagmus, and even to interrogate the vestibular nerve with electric currents (using as much as possible Babinski's method).

It is indeed very interesting to note, without bias, the information obtained either by the revolving chair or by the caloric test; allowing between these different tests the time necessary for the stimulated labyrinth to recover its normal equilibrium. We note subsequently the results furnished by these various experiments, and we see in what measure they agree with the other functional and objective conditions found in our labyrinth cases due to the war.

Diagnosis.—We do not think that this is the place—this paper

being intended especially for specialists—to discuss at length all the questions which are connected with the diagnosis of these traumatic labyrinths, at their different periods of evolution. But there are two points to which attention must be directed: these are those which enable us to detect hysteria and malingering. It may be said at once, moreover, that it is generally easy to determine the organic from the functional cases, the latter term applying equally to hysterics and malingerers; it is, on the other hand, most often extremely difficult with patients of this class to apply to some the label of hysteria, to others that of simulation.

Let us review first the symptomatic characters which enable us to place patients in the functional group: they are summed up in that their deafness is absolute, “too absolute to be real” (Moure). It is always, in fact, or nearly always, bilateral (unilateral malingerers are exceptional, and, moreover, are easy to detect by the use of Lombard’s noise-producer and by the double-branched otoscopic tube well handled; therefore we will not mention them again). This deafness is absolute to the point that the patients say they hear absolutely nothing, whatever the intensity of the sound made around them; the carpal tuning-fork is not, however, perceived more than the tuning-fork *ut² struck energetically* and applied to the mastoid or even at the entrance of the auditory meatus (Moure). Further, there are neither tinnitus, nor vertigo, nor nystagmus, nor disturbance of equilibration (unless we have to deal with patients educated by passage through other hospitals). Finally, an important character and upon which all aurists are agreed, the timbre and tone of the voice of these two classes of patients remain normal, which implies, knowingly or not, that they can hear themselves speak.

Now how can hysterics be separated from malingerers?

With Prof. Moure, we consider that the criterion lies, when all is said and done, in the sole fact of catching the patient *in flagrante delicto* of fraud; an argument assuredly more psychological than medical, but to which, in default of a better, one is often compelled to resort.

Nevertheless, great presumptive evidence can be drawn from attentive observation of the patient. Under the influence of the noise-producing apparatus, the hysteric will sometimes preserve the tone of his voice, like the patient with organic disease; the unwarned malingerer will always raise it. The attitudes of the malingerer are false and lacking in naturalness: he affects an air detached from the things of this world, whilst the hysteric seeks

rather to attract attention. Finally, the hysteric may show zones of cutaneous anæsthesia, a certain reduction of the visual field, abolition of the pharyngeal reflex, which a malingerer never has.

The diagnosis once made with as much certainty and promptness as possible, the patient will be transferred immediately to the neuro-psychiatric service, if he is considered to be an hysteric. Everyone is now agreed as to the importance of not allowing this class of patient, so open to suggestion, to sojourn in a non-special hospital. We have had personal experience of three cases of hysterics educated by their stay in several hospitals who presented notably disorders of equilibration with vomiting sufficiently marked to prevent them from keeping upright! The patients got worse at each examination, and became thus incurable for months, and perhaps for years, by the fault of their doctors.

Course and Prognosis.—Putting aside hysterics and malingerers, who are, moreover, rare (we speak here only of patients who have passed through our centre), organic labyrinth cases terminate in two ways: the simple disturbances are *cured* in several weeks; the others *get slightly better or stop as they are*. None grow worse with time, by reason of their causal injury; with these, if their deafness increases, it is on account of some intercurrent cause supervening (Moure).

In every case the purely vestibular phenomena disappear or diminish first: first the disorders of equilibration, then the vertigos and spontaneous nystagmus, which usually disappear together. The disturbances of induced nystagmus (hypoexcitability) persist long. As to tinnitus, it remains unchanged and probably definite.

Treatment.—At the commencement we put the patients on absolute rest and a solution of bromide and iodide (bromide 1–2 grm., iodide 0.25 to 0.50 grm. *per diem*). Counter irritation over the mastoid in the form of canterly or leeches. Light diet. Lumbar puncture in severe vertigo (rare in the zone of the interior). In fine, symptomatic medication and good nursing.

No insufflations, especially no otomassage in any form, because it is useless and even dangerous, rest of the organ being as indispensable as that of the patient.

Note.—From the purely military point of view, and particularly as touching the granting of a pension or gratuity or change of arm, the following are the rules which Prof. Moure has adopted:

(a) Slight forms (*commotio*). Treatment and convalescence until cured, in all several weeks. Return to *dépôt*. Sometimes unfit to return to the front for two months.

(b) Severe forms (true labyrinthitis). Treatment and convalescence. Then, according to auditory acuity, reserve or half-pay temporarily, both renewable every three or six months, with equally temporary allowance.

The position to be reviewed or cleared up after the war. No actual definite decision, although it seems to us, alas! from the experience gained since the beginning of the war, that a good number of cases of serious deafness by organic lesion of the internal ear may be destined to remain definite.

For this group of deaf cases must be applied, in due time, methods of auditory reeducation or lip reading.

CLINICAL NOTE.

TWO CASES OF REFERRED SENSATION (ARNOLD'S BRANCH OF VAGUS NERVE).

By T. A. MACGIBBON, M.B.,

Christchurch, New Zealand.

CASE 1.—A man, about thirty-five, came in complaining of having a desire to swallow something in throat after each meal. Duration two years.

Examination.—Nothing in pharynx or larynx beyond signs of slight irritation.

In left ear was found a complete ear of barley grass, jammed across the external meatus with its barb in the anterior wall, covered with hardened cerumen.

Removal.—Cure.

Man said he was sleeping in hay over two years ago.

CASE 2.—Boy, aged fifteen, deaf-mute; attending school for deaf; stone deaf in right ear; can distinguish loud low sounds in left ear by air and bone, not intelligible to him.

Complained of something in throat; another specialist removed adenoids six weeks before seeing me; voice said by teacher to have been worse since operation.

Examination.—Complete ear, with grain, of wild barley in left meatus; removed; found covered with more recent cerumen. No history of how barley came to be in ear.

Relieved sensation in throat, but could say nothing as to voice, which is the mechanical one of a deaf person.

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

April 7, 1916.

DR. J. W. BOND, *President, in the Chair.*

THE PRESIDENT: The case which I showed at the last meeting has been examined microscopically, and is an endothelioma.¹

Specimens from a Case of Laryngeal Crises with Abductor Paralysis.—E. D. D. Davis.²

DR. P. WATSON-WILLIAMS: This is an exceedingly interesting case, made much more valuable by the research of the pathologists, which has been demonstrated. It is not clear from the notes why the man died half an hour after the performance of the tracheotomy. Was the condition so desperate, and had it been going on long enough to account for the fatal ending when relieved by the tracheotomy? I suggest it as possible that the cause of death was due to atrophic changes in the nucleus ambiguus extending to the cardio-inhibitory cells. In many of the cases of tabes involving the vocal cords, one has evidence of the extension of the atrophic process to the cardio-inhibitory nuclei, the evidence being the *persistently rapid pulse-rate during rest, and in the absence of febrile conditions* this is often a valuable differentiating symptom. There may be one vocal cord only involved, but even when both sides are paralysed (abductor paralysis)—the more common occurrence—one may be in doubt whether, in the absence of other features to clear up the diagnosis, the paralysis is not due to a bulbar lesion. Now the latter view as against peripheral pressure is much supported by the rapid pulse-rate. I think that was the case in the present patient, his pulse being persistently frequent, and that he died from cardiac failure.

DR. F. DE HAVILLAND HALL: I had the privilege with Dr. Semon (as he then was) of seeing the first case in which this abductor paralysis was noted in association with tabes in this country, and the present case confirms the advice then given as to the extreme importance of carrying out an early tracheotomy. Dr. Felix Semon was telegraphed for, and when he arrived the patient was apparently dead. A tracheotomy was done at once and the man lived for some years afterwards. Sir Felix since then has advised that as soon as there are signs of marked interference with breathing in tabes associated with an abductor paralysis, a prophylactic tracheotomy should be done without delay. It is surprising with what a small chink for admission of air patients can manage to exist; probably because the obstruction is developed only gradually, so that the system gets inured to the cutting off of the air supply. If obstruction to the same degree were to occur suddenly, the patient would be *in extremis*.

MR. MARK HOVELL: I understood Dr. de Havilland Hall to say that

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., July, 1916, p. 308.

² See p. 361 of this issue.

Sir Felix Semon was the first to recommend that tracheotomy should be done when bilateral abductor paralysis existed. If that statement was made, it was incorrect, for Sir Morell Mackenzie laid down that principle years before, and it is mentioned in his book which was published in 1880.

Mr. TILLEY: From a practical point of view I uphold what Dr. de Havilland Hall has said. There is a man managing a small refreshment shop near here, who eighteen years ago came into the Throat Hospital, Great Portland Street, suffering from extreme dyspnœa. He was in too serious a condition to allow of a general anæsthetic, so I inserted a tracheotomy tube without it. He is still alive. I cannot be sure what was the nature of the lesion; he had no symptoms of tabes, and we could not find any intrathoracic lesion which would interfere with the recurrent laryngeal nerves. It is easy to imagine a patient getting a sudden inflammatory lesion in both crico-arytænoid joints, and then for the inflammation to clear up, the joint being left fixed. Only last Saturday I saw an old gentleman who for five years has had bilateral abductor paralysis, and on two or three occasions he has been nearly suffocated. In his spine and other joints he has advanced arthritic conditions, and both arytænoids are fixed. He has only a small glottic aperture, and if he exerts himself he gets into a serious state of glottic dyspnœa. X-rays give us but little information, except that there is a dilatation of the aorta with a shadow, which may indicate a sacculated aneurysm. If a paralysis is bilateral, whatever the cause may be—*i. e.* whether it be a central or a peripheral lesion—immediate tracheotomy may often result in a prolongation of the patient's life.

Dr. DUNDAS GRANT: The interest here is the relation of the two symptoms described; one is the adductor spasm or crisis, the other the paralysis of abduction. There seems to be a combination of both in this case. Dr. Sano has pointed out that the lesion here is a paralysis rather than a cortical irritation. We see laryngeal crises apart from paralysis of the vocal cords, and we see paralysis of abduction without what one may strictly call a crisis. What usually happens in paralysis of the abductors is that the patient makes a howling noise during inspiration, especially during sleep. I should like to ask Dr. Sano if he can tell us what lies at the foundation of the laryngeal crisis. Apparently this man had a crisis about twice a week, and at the same time he had this paralysis of abduction. The reason patients with paralysis of abduction get on so well, comparatively speaking, without tracheotomy is that in cases in which the disease is a progressive one affecting the recurrent laryngeal nerve, there is a definite sequence in which the muscles atrophy: first the posterior crico-arytænoid, then the internal tensors—*i. e.* the internal thyro-arytænoids—then the arytænoid muscles. These atrophy before the lateral crico-arytænoids, the atrophy of which would save the situation in so far as the stridor is concerned, though it would lead to loss of voice and probably regurgitation of liquids. It is the wasting of these muscles secondarily which enables people with paralysis of abduction from a progressive lesion of the recurrent laryngeal nerve to breathe after a fashion and to decline tracheotomy.

Dr. WILLIAM HILL: I should like to know whether Dr. Sano has specimens showing the changes in the laryngeal nerves and muscles. There is a serious medico-legal question involved here. This man had a painful spasm in the muscles round the neck which might cause him suddenly to fall down dead. He refused tracheotomy, and yet went on driving his cab. If he had died suddenly while driving, his cab might

have dashed into a shop window or have been precipitated over the Embankment. Whose duty was it to prevent him driving? Should one notify the Commissioner of Police that he was suffering from a condition which renders him liable to the accident I have mentioned?

Dr. Saxo (in reply): The question here is whether there was paralysis due to hypotonicity and paralytic conditions of muscle, or whether there was irritation, causing contracture. What we found pathologically is more a proof of actual paralysis than of irritation; it is very difficult, in a microscopical preparation, to find indications of irritation. I do not find any increase of neuroglia around the cells in the section. I find only a process of atrophy and weakness. In the spasms of tabes and lateral sclerosis there are often contractures; but there are also moments when the person is too tired. What can occur in the limbs can also occur in the larynx. I have only examined one side of the problem, and I must leave Mr. E. D. D. Davis to speak for the clinical part.

Mr. E. D. D. DAVIS (in reply): The laryngeal muscles were atrophied, and the nerves were very difficult to find. I offered the muscles to Dr. Mott for microscopical examination, but time did not permit. The man promised to stop driving his cab. When he came back to hospital I did not inquire what he was doing, but I found out before he died that he was again driving his cab. He was very ill when I saw him, and by my instructions he had been given morphia and atropine some hours before. I brought him here in 1909, when many members advised tracheotomy; but Sir Felix Semon said he would wait, because the spasm of the adductor muscles might pass off and relieve the patient. With regard to heart failure after tracheotomy, his pulse was very bad: but while I was washing my hands twenty minutes afterwards, he coughed up the tube, and though I replaced it fairly quickly, he was dead. On some occasions the pulse-rate was 120.

Laryngeal Stenosis, following a Bayonet Wound, treated by Intubation.—E. D. D. DAVIS.—Private J—, who was wounded in the shoulder, received a second bayonet thrust in the larynx on October 13, 1914, and was taken prisoner. The lower third of the thyroid cartilage was apparently destroyed, and a German surgeon inserted a large tracheotomy tube on December 4. When seen at Millbank on March 3, 1915, he was wearing a large curved cannula inserted through the larynx with an upward extension of $\frac{3}{4}$ in. (the cannula is shown). He could neither speak nor breathe through the mouth. He had to write everything to make himself understood. At an operation on March 5, 1915, tracheotomy was performed and the thyroid cartilage was exposed. The cannula was removed, and its extension was found to be buried in scar tissue. The cavity of the larynx was discovered by passing an intubation tube from above. The alæ of the thyroid cartilage were separated by $\frac{1}{2}$ in. of scar tissue at least $\frac{1}{4}$ in. thick. A large gap, about 1 in. wide, existed between the larynx and the upper end of the trachea, in which the posterior wall of the trachea and larynx alone remained. A rubber drainage-tube was inserted from the tracheotomy opening below, to the orifice of the larynx above, and the wound closed as far as possible, with the exception of the gap produced by the old cannula. The rubber tube was replaced, later on, by the intubation tube, fixed by a midwifery forceps clip passed through the lower tracheotomy opening. The intubation tube and clip were described by Mr. Barwell in the *Lancet* on January 2, 1915 (a pattern was shown, also the various tubes used).

The patient speaks well in a loud whisper; the intubation tube has been worn for twelve months almost continuously, and it has been removed recently, but he cannot do without a tracheotomy tube. Suggestions as to treatment are invited.

Dr. JOHNSON HORNE: I ask for the experience of others in dealing with this kind of case. I have had one or two of similar nature, and they are not easy to treat. I congratulate Mr. Davis on his successful result.

Chronic Frontal Sinus Empyema treated by the Intranasal Method.—Herbert Tilley.—To save space and repetition it may be said that the following cases suffered from one or more of the usual symptoms of sinus empyema—viz. chronic purulent nasal discharge, headache or frontal discomfort, nasal obstruction, and impaired condition of general health. The treatment following operation has been practically the same in all cases—viz. no plugging of any kind after the operation, no interference for the first forty-eight hours, and then daily irrigation of the sinuses with warm normal saline containing a small quantity of peroxide of hydrogen solution. As an occasional change from this, tincture of iodine, 1 dr. to the pint of normal saline, has been used.

Mr. C. C.—, aged forty-three. Examination, September 17, 1915: Nasal septum deflected to left. Polypi and purulent discharge in each ethmoidal region. Had a previous operation on right side. Operation, October 4, 1915: Intranasal opening of right frontal sinus and antrum and removal of left anterior ethmoidal cells. November 4, 1915: No discharge from any of the sinuses.

Mrs. G.—, aged forty. Admitted to University College Hospital on March 1, 1916. Left-sided nasal discharge and supra-orbital pain of three years' duration existed. Examination: Pus and polypoid buds in anterior region of left middle meatus. It was only possible to pass a fine probe into the left frontal sinus. First operation, March 2: Anterior half of middle turbinal and diseased anterior ethmoidal cells removed. Free oozing was only slightly diminished by adrenalin and cocaine. A probe could be passed into the frontal sinus, but not a small raspatory. Further intervention postponed in view of bleeding, which obscured field of operation. During the following days a fine cannula could be passed, but no return of fluid could be obtained. Second operation, March 13: After many attempts, a small raspatory entered the sinus, and the frontal sinus ostium was freely enlarged. March 14: Temperature 103° F. Both eyelids swollen and œdematous; no conjunctival swelling nor ecchymosis. March 15: Slight œdema of right eyelids. Under influence of frequent fomentations and daily irrigation of left sinus the external symptoms and pyrexia subsided, and the discharge from sinus ceased.¹ The case illustrates the difficulties which may be encountered when free bleeding complicates a very narrow fronto-nasal canal.

H. C.—, aged thirty-one. Admitted to University College Hospital on February 28, 1916, for frontal headache of "several years" duration, and a "blocked nose" for the same length of time. Examination: Both nasal cavities filled with polypi bathed in pus. Both antra dark and contained pus. Operation, March 2: Polypi removed. Both antra opened by intranasal method. Ethmoidal regions curetted and sphenoidal sinuses opened. Both frontal sinus ostia were enlarged by

¹ The symptoms for which patient was admitted have now disappeared (May 16).

exhibitor's raspatories after a lapse of forty-eight hours. Sinuses have been irrigated daily till the patient left hospital on March 29. Whenever the left sinus is irrigated the fluid returns from the right nasal cavity, showing perforation of intersinus septum. Complication: On March 12 patient had acute lacunar tonsillitis on left side, with large and tender swelling of glands behind the angle of the jaw. March 14: Temperature 104° F. In my absence an incision was made into glands but no pus evacuated. Under influence of hot fomentations glands subsided. The patient's original symptoms have entirely disappeared. The tonsillitis set in nine to ten days after operation upon the sinuses, and it is not clear what was the relationship between the conditions, because, from the nasal point of view, the sinuses were irrigated daily (after a lapse of forty-eight hours following operation) and appeared to be exceptionally clean and well drained. It is easy to see into each sphenoidal sinus at the present time.

Mr. McL——, aged fifty. Subject to attacks of acute iritis in right eye associated with chronic discharge from, and obstruction in, right nasal cavity. Examination: Right nasal cavity filled with polypi bathed in pus. All the right sinuses proved to contain pus. Operation, October, 1915: Removal of greater part of right ethmoidal lateral mass with polypi growing therefrom: right fronto-nasal canal and osteum enlarged: inner antral wall removed (endo-nasal method). Complication: Attack of acute iritis supervened on the operation. As a result of daily irrigation of the sinuses for three weeks the discharge entirely ceased. It is too soon to determine whether the attacks of acute iritis will cease now that the sinuses have been rendered healthy.

Dr. P. WATSON-WILLIAMS: I congratulate Mr. Tilley on his excellent series of cases, and it is gratifying to find these sinuses so remarkably free from secretion. But one must not take such a successful series as a criterion of all cases which are amenable to treatment by the nasal method. In a case I showed when introducing the special discussion on this subject, one in which I was able to stand by the side and pass bougies of the size I show, 19 mm. in circumference, there was most perfect freedom of drainage from the frontal sinus; yet the patient had recurrence of symptoms, and eventually I had to perform an external operation. However successful cases apparently are you cannot be certain there will not be a recurrence and further trouble: it is not merely a question of getting a free exit for discharges. When advocating the per-nasal method, we must be guarded about speaking of cure, otherwise we may have to eat our words. I was particularly interested in Mr. Tilley's case of iritis before the operation, as I recently had a similar case in a female, in whom I had to make an opening and provide for drainage of all the sinuses. She had a recurrence of iritis and acute inflammatory injection of conjunctiva shortly after the operation, and I do not doubt that the operation on the nasal sinuses determined the recrudescence of the attack. This, however, soon cleared up. I shall be glad to know what is the sequel here: it will be an interesting case to watch.

Dr. DONELAN: I should like to ask whether the general experience is in favour of the continued use of peroxide of hydrogen, and whether it has been found to set up anosmia of a more or less permanent character. Also, has not the continued use of chloride of sodium a disintegrating effect on the epitheum? It was a point made by Sir Morell Mackenzie, who substituted sulphate of sodium in his modification of Dobell's solution.

DR. DUNDAS GRANT: I congratulate Mr. Tilley on his interesting cases, and should be glad to know whether they are a sequence of cases or were interspersed with others in which it was necessary to do the external operation. If they are a sequence, it is a very interesting demonstration of the efficiency of the intranasal treatment, just as Mr. Tilley's former groups of cases of the external operation were convincing of the value of the external operation. I have always been even a keener advocate of the intranasal treatment than my friends and colleagues, and I am glad to find that the views I held in old days have been adopted and maintained so successfully by Mr. Tilley. I think we shall agree that there are cases in which the intranasal method is not successful, however keen we may be about it. Sometimes, when I have opened the frontal sinus, I have found it filled with polypi, or with a very soft form of oedematous fibrous tissue. In one case the contents (shown before the Section) proved to be adenoid tissue. The only possible treatment in such cases is to open the frontal sinus. After the polypoid substance has been scraped out, these cases do excellently, even without any great attempt being made to enlarge the fronto-nasal duct. The X-ray data make it possible to diagnose them, and as a rule they are accompanied by less suppuration. After studying this series, probably those who have not hitherto trusted to the intranasal operation will be led to do so. The bougies which I devised a number of years ago and showed to the Laryngological Society in January, 1906, will be found of considerable use.

MR. W. STUART-LOW: I wish to ask Mr. Tilley whether he brings forward these cases as cured. I am opposed, on principle, to treating the frontal sinus through the nose. This should be done merely to prepare the interior of the nose. If there are polypi in the frontal sinus, this method of treatment will not cure the condition. If there are no polypi, removal of the ethmoid will probably do so. How is one to decide whether polypi are present? If they continue troublesome, you must perform Ogston's operation. I asked Dr. Watson-Williams whether he has given up these operations, and he said he probably has. Killian's operation is often unnecessary. There is deviation of the septum in two of these cases of Mr. Tilley's, and in another there is a polypoid condition on the under surface, and there is still muco-pus. It is a bad principle to pass bougies up the canal; this is not done in any other part of the body. I ask Mr. Tilley whether he is still performing intranasal operations for the cure of antral trouble. [MR. TILLEY: "No."]

DR. PEGLER: Polypi are often spoken of in this connection as if they were similar to the polypi found in the nasal cavity. Some years ago I made many sections of frontal sinus polypi so called, and noticed that under the microscope they proved to be quite a different class of growth from the ordinary mucous polypus. It is an important question whether, under modern treatment, it is possible for the life of this very delicate alga-like form of granulation to continue. If the cavity is freely douché with antiseptics, and especially if such active agents as nitrate of silver solutions are injected into it, I should expect these delicate growths to disappear.

DR. DAN MCKENZIE: I take it that this operation is under trial, and it is only by seeing such cases as are shown to-day and discussing their results and the reasons for the operation that we can know for what cases this operation is supposed to be suitable. I think we have not yet found what cases should be submitted to the internal, and what to the external operation: consequently it is yet early for condemnatory re-

marks. So far as the operative procedure is concerned, there is much to be said for it from one standpoint, and something may be urged against it from another. When it was discussed on a former occasion I expressed myself strongly about the danger to the cribriform plate likely to result from the operation. There is a further danger—namely, to the orbit. It is a very narrow canal, and it is easy to break down the papyraceous bone and to start orbital cellulitis. In the male patient I showed this took place, but, fortunately, only slightly; it did not reach the abscess stage. In cases of polypi in the sinus I do not expect the external operation to cure the patient; there is nearly always some discharge afterwards, sometimes considerable in quantity, and the external operation is more dangerous to the patient's life than the internal, which is a minor operation. In the case alluded to I operated on both antra, the septum, and both frontal sinuses at one sitting, and the whole did not occupy more than an hour. Reverting to the danger to the orbit, let me say that if the finger be kept on the outside, the instrument can be felt passing up the infundibulum to the frontal sinus, and in this way the bone may be prevented from being broken through during operation. Mr. Tilley has had difficulty with bleeding, and I suggest to him—what other members may know—that Freer, of Chicago, introduced, some years ago, instead of the tampon of adrenalin and cocaine, what he calls "cocaine mud," that is, pure cocaine hydrochlorate in pure adrenalin solution, 1 in 1000. It is extraordinarily safe: I do all my nasal septum cases with that mixture. I use 3 gr. to 4 gr. to do an operation, and I have never seen a patient suffer from it. If it be applied to any part of the nose one can easily get a blanched field, so that the operation almost invariably becomes a bloodless one. I have even opened the maxillary antrum in this way without having had any bleeding at all. I think we ought to regard the operation now being discussed as in a purely experimental stage: let us try it cautiously, and see what results it yields.

Dr. W. HILL: Has Mr. Tilley done external operations during the last two years? I have been converted to the per-nasal route.

Mr. TILLEY (in reply): Dr. Watson-Williams speaks of certainty of cure not being entirely dependent on free drainage, and I agree, because I think two factors determine this point. One is free drainage, and the other is the establishment of a healthy lining mucous membrane in place of the diseased condition it is in when the operation is performed. The latter is carried out by frequent irrigation, and by injecting into the sinus very strong nitrate of silver solutions to destroy the delicate chronic inflammatory tissue to which Dr. Pegler has referred. I employ solutions from 80 gr. to 100 gr. to the ounce. Dr. Donelan raises the question of the use of hydrogen peroxide irrigations causing anosmia. I have not had experience of that, although it is conceivable, because many of the samples which are commonly used contain an admixture of acid and are irritating to sensitive mucous membranes. Dr. Dundas Grant asks as to the sequence of my cases. They are all recent cases and I do not show them as instances of cures, but hope they may prove to be so. Two are private patients and two are hospital cases; two others of longer duration could not come to-day—they were operated upon six months ago. Mr. Stuart-Low says that muco-pus is still present in all the cases. In two of them there is not a shred of mucus nor of pus. I have shown them to illustrate the complications with which we may possibly meet in the intranasal operation. One patient had great oedema of the left eyelids and a temperature of 103° F. next

morning. In forty-eight hours the cedema had spread to the right eye, and I began to wonder whether I was going to experience my first case of osteomyelitis following the intranasal operation. But the condition passed off and to-day she has no pus in the left sinus at all. The discharge which one sees comes from the granulations on the anterior face of the remaining ethmoidal cells. Another of the patients was shown because he had tonsilitis more than a week after the operation, and a large mass of inflamed glands in his neck. The best criteria of the operation are the patients themselves, who will tell you how they feel now as compared with their condition before the operation. If you can so far relieve these patients from the symptoms from which they suffered, I do not think it matters even if a little muco-pus comes from the sinuss; you have cured their symptoms so far as the patients are concerned. I have not opened the frontal sinuss from the outside for chronic empyema for four years, and in ordinary cases I shall not do so without employing the intranasal method first. If the intranasal method relieves the symptoms for which the patient came to me, I should not proceed to the external operation at all, even though a small quantity of discharge from the sinuss continued, because, if the drainage is free, that discharge in itself does not constitute a menace to the patient's life, and very often he may be unaware of it at all. One member suggested that these cases have scarcely been touched, and another referred to the presence of deflected septa. Two of the patients have deflected septa; but why remove a septal deflection about which the patient knows nothing and when it is causing no symptoms? When such deformity hampers an intranasal frontal sinus operation, it can always be temporarily obviated by means of a long-bladed speculum. And if you remove the septum, there will possibly be too great a draught of air going down one side, and more harm will be done by correcting the septum than by leaving it alone. I have successfully performed the internal operation for acute empyema complicated by an external fistula.

Paralysis of the Left Vocal Cord in a Woman, aged Twenty-five.—James Donelan.—Patient, a married woman, had a miscarriage at the seventh month in 1912, and another at the sixth month in 1913. She began to be somewhat hoarse in November, 1915, and this was associated with repeated attacks of violent headache. On February 8, 1916, on awaking she found she had completely lost her voice.

I believe it to be a syphilitic case. It has greatly improved during the last three weeks under iodide of potassium and mercury. The patient has recovered some voice. Her husband is syphilitic.

Achalasia of the Cardia cured by the Passage of a Gastric Tube kept in Position for Four Days.—W. M. Mollison.—E. H.—, female, aged thirty-six, was admitted to hospital for inability to swallow, and vomiting. She had previously been operated upon for abdominal symptoms, for which ileo-sigmoid anastomosis and gastro-jejunostomy had been performed. Œsophagoscopy showed great dilatation of the Œsophagus, which was filled with the remains of bismuth administered six days before; this was washed out. Apart from the dilatation no abnormality was found; a gastric tube was passed, through which the patient was fed for four days; she was then given semi-solids, and gradually recovered the power of swallowing ordinary food without any difficulty. There was no return of the vomiting.

Radiogram of the Œsophagus of a case of Carcinoma which presented itself as an Achalasia.—W. M. Mollison.—J. G—, male, aged forty-nine, was admitted to Guy's Hospital in November, 1915, on account of total inability to swallow. Œsophagoscopy revealed no abnormality, and the following day the patient could swallow normally. Five weeks later he was again admitted for the same symptom, total inability to swallow, and he was now very ill and had to be helped into the ward. Again Œsophagoscopy showed no lesion; a gastric tube was passed and left *in situ* for twenty-four hours; at the end of that time it was removed, and the patient swallowed perfectly well.

I quoted this case at the December meeting, and suggested then that the case might turn out to be one of malignant disease. The radiogram shows that this is so, and his doctor writes that the patient is very ill in an infirmary, dying with symptoms of malignant disease of the lower end of the Œsophagus.

Tracheitis Sicca.—W. M. Mollison.—Female, aged eighteen, complains of "foul breath." She has had unpleasant yellow discharge from the nose, but this is now better; the antra have been washed out and are clear. In the trachea are to be seen greenish-black crusts; at times the patient coughs up small pieces, but finds very great difficulty in doing so. Treatment has not improved the condition; she has been given inhalations of tinct. benzoin co. in hot water; capsules of creosote (5 minims), and lastly intratracheal injections of 10 per cent. menthol in paraffin.

Suppuration in the Antrum of Highmore associated with uncommon conditions.—W. Jobson Horne.—*Case 1: Gunshot Wound of Face involving Right Antrum.*—The patient, aged twenty-three, is a private in the Coldstream Guards. On November 5, 1914, whilst sniping in Flanders, he was struck by a bullet in the upper lip just to the left of the middle line. The bullet shattered all the teeth in the upper jaw, ploughed up the right half of the lip and part of the cheek. On November 9, 1914, he was back in England and in hospital. The mutilation of the mouth and right side of face was rectified by operations. The upper jaw was completely cleared of the remains of the teeth. In February, 1915, he left hospital and was on furlough till May 10, 1915, then returned to his regiment in England. In June, 1915, a dental plate was fitted. A purulent discharge into the mouth was experienced from the time of the injury. To prevent the discharge an operation was performed in December, 1915. After this the discharge ceased to enter the mouth but passed through the right nostril. A second dental plate was fitted in January, 1916, and he returned again to his regiment. As the purulent nasal discharge persisted the patient was sent to the Metropolitan Ear, Nose and Throat Hospital on March 8, 1916. Some puffiness of the cheek over the antrum, and above the right angle of the mouth, suggested underlying dead bone; this puffiness was partly accounted for by the soft tissues having been drawn up from the lower part of the face in order to rectify the mutilation. On the head being lowered the right nostril became filled with pus. On transillumination the right antrum was dark. An examination with the X rays detected no foreign body, but showed some loss of bone.

Operation: The antrum was opened through the canine fossa and drained through the nose and mouth. Some bare bone was detected

beneath the puffy region referred to, but no pus external to the antrum was found. Owing to the high formation of the palate, the floor of the antrum is considerably below the level of the floor of the nose.

At the time of writing these notes the discharge is decidedly less, and has almost ceased, but suggestions for future treatment, should there be a recurrence of the purulent discharge, are invited.

Case 2.—J. E.—, gunner, R.F.A., aged nineteen. He has had aphonia for three months following a cold contracted at the front. Larynx: Impaired adduction, loss of tension cords. Thorax: X-rays show infiltration of right upper pulmonary lobe. Tubercle bacilli are present in the sputum. The larynx presents an appearance not uncommonly seen in cases of aphonia invalidated from the front, and at times spoken of as "functional."

Dr. DAN MCKENZIE: In the first case the patient may be suffering from osteomyelitis, and I suggest that Dr. Horne should keep his eye upon it for the next six months, in the event of there being a recurrence. I have seen, on two occasions, fatal osteomyelitis begin in the antrum, and with such symptoms as are mentioned in these notes, puffiness over the cheek and angle of the mouth. This is remedied for the time being by removing the dead bone, but the symptoms are very apt to recur.

Intrinsic Cancer of the Larynx.—**Case to show certain indications in regard to Laryngo-fissure and Complete Excision of the Larynx.**—**Sir StClair Thomson.**—W. S.—, aged fifty-six, admitted to King's College Hospital on January 27, 1916, for hoarseness of voice.

Previous history: Hoarse for one year; recent dyspnœa, no dysphagia, slight cough.

Present condition: Voice very husky, and stridor even when at rest. Glottis reduced to a chink. The left vocal cord is quite fixed in the middle line with grey-yellow ulcerating infiltration from the vocal process up and into the epiglottis. Low down in the anterior commissure is a red granulation, which suggests perichondritis of the thyroid cartilage. The right vocal cord moves feebly; it is replaced by an irregular cauliflower-like, pale reddish infiltration. The anterior commissure appears involved. The arytenoids are free. There are no glands. Patient has good teeth; non-smoker for thirty-three years; Wassermann's reaction negative. Tubercle bacilli absent from sputum.

February 3: Portion of growth removed by indirect method with the Mackenzie forceps and found to be a squamous-celled carcinoma.

February 12: A median tracheotomy was done under local analgesia and a Durham's tube inserted. The trachea was laid bare on each side and packed with iodoform ribbon gauze. This packing was done with the object of exciting granulations and so anchoring the trachea to the cellular and muscular tissue of the neck. The idea was taken from the article of G. W. Crile.¹

March 2: Operation commenced for complete excision of the larynx. Middle line of neck infiltrated with 2 per cent. novocain, with a few drops of adrenalin. Chloroform was given. The first incision revealed just above the thyro-hyoid membrane a gland, about the size of a large haricot bean. This at once showed that the growth was no longer intrinsic. On removing the exposed gland there was an escape of some thirty drops of pus, and with a probe it was found that the thyroid cartilage had been invaded. The operation was therefore abandoned.

¹ *Laryngoscope*, 1912, xxii, No. 12, p. 1317.

The case is shown for the following reasons :

(1) Long-standing hoarseness and extensive disease in the endolarynx, without any visible extrinsic developments.

(2) Involvement of both cords.

(3) Marked extension of the disease to the anterior commissure (it is generally taught that malignant disease affects the posterior commissure by preference).

(4) The suggestion of perichondritis, given by the granulation, in the anterior commissure.

(5) The gland on the crico-thyroid membrane is the first involved.

(6) The involvement and perichondritis of the thyroid cartilage may only be revealed at operation. (I had a similar case a good many years ago, and fortunately am able to show a coloured drawing of it.)

(7) The plan for anchoring the trachea—by packing round it, for between two and three weeks—promised to be most satisfactory, and I should employ it another time to prevent the retraction of the divided trachea into the chest.

A section of the small gland from the cricoid membrane is shown.

The PRESIDENT: Apparently a laryngo-fissure failed to secure a satisfactory result, and a very extensive laryngectomy was not decided on.

Epithelioma of the Palate.—W. Stuart-Low.—This case was shown at the last meeting.¹ Since then the induration around the ulcer has increased. There is much more pain on swallowing, and the deep glands at the angle of the jaw have become harder.

Malignant Disease treated by Diathermy.—J. W. Bond (President).—The patient is a man, aged seventy, who underwent diathermy. He had two sittings, one in October and one in November last year. There was a four months' history; and, when first operated upon, a large ulcerating mass affected the tonsillar region, encroaching upon the palate, passing down to the angle between the tongue and tonsil, and a little way on the tongue itself. For five months following the two sittings he has been very comfortable. Before the first diathermy treatment he was in a most miserable condition; he was pale, wasted, and found it very difficult to take food. He still has some pain in the ear, and I do not think the case can be considered cured. I recommend diathermy in cases of this kind. It seems to give more relief in inoperable cases than any other method.

Dr. WATSON-WILLIAMS: I hope, Sir, you will give a full description of the condition before the operation, because the results seem to be so gratifying that I imagine you were perhaps surprised at it. Is it not possible that the pain the patient now has is due to cicatricial contraction? He complains of a difficulty in opening his mouth.

Dr. DUNDAS GRANT: It is a most gratifying result. Was it microscopically proved to be epithelioma?

Mr. ROSE: I have treated a number of these cases by diathermy, and in some of them the neck has been much swollen for a week or ten days afterwards. I have noticed that in patients who turn up two years after the original diathermy with evidence of recurrence, an almost normal epithelium may cover extensive disease. I am therefore convinced that after diathermy epithelium grows over tissue which still contains malignant cells.

Dr. DAN MCKENZIE: I ask if members have had experience of the

¹ See JOURN. OF LARYNGOL., RHINOL., AND OTOL., July, 1916, p. 303.

use of diathermy in sarcoma, as opposed to carcinoma or epithelioma of the throat; if so, whether the results are different? Also, would it be better, in recurrence of sarcoma, to use radium rather than diathermy?

Mr. ROSE (in reply to Dr. McKenzie): I have used diathermy once for sarcoma, but without knowing it. The growth was a melanotic sarcoma in the hard palate. I hope to show the patient to the Section.

The PRESIDENT (in reply): The case has not been proved to be epithelioma. The application lasted ten minutes each time. I operated upon two men in this way on the same day. The other patient was aged seventy-four, and he has done equally well. It was a similar case, the disease being situated on the same side of the throat. The patient I showed was worse than the other one for two days after operation. There was a little swelling, but nothing to cause alarm. At the first sitting I made a circuit of the area in eight places. At the second operation, instead of burning definite spots, the instrument was slid along in a circle round the growth, and the diathermy done with a smooth surface, not a point.

Retro-pharyngeal Abscess due to Breaking Down of a Tubercular Gland.—Irwin Moore.—The patient is a female, aged twenty-five, who was admitted to hospital on February 24, complaining of a swelling in the mouth for one month, accompanied by soreness at night and some difficulty in swallowing. She was said to have swallowed a fish-bone about fourteen days before the swelling was noticed. There has been no febrile disturbance. She is married and has one child, aged three, who has recently been operated upon for tubercular glands in the neck.

On examination a well-marked and prominent swelling was seen occupying the right half of the pharynx and extending for some distance downwards to about the level of the upper part of the larynx. On palpation it was found to be boggy and semi-fluctuating, with a thickened wall. The tonsils were broad and contained open crypts. Some enlarged cervical glands could be felt on each side of the neck along the posterior border of the sternomastoids. A diagram showed no indication of caries of the spine.

On March 13 operation had to be postponed on account of an acute attack of follicular tonsillitis. A week later the abscess was opened by dissection from the posterior border of the right sternomastoid; about $\frac{1}{2}$ oz. of pus was evacuated and a drainage-tube inserted. Some tubercular-looking glands were also removed from the side of the neck. Examination of the pus showed that it was of a caseous rather than purulent nature—i. e. it did not contain pus cells. No bacteria were found in a Gram-stained film, and none grew in culture. In view of this result a film was stained for tubercle bacilli, and these were found to be present in extremely small numbers. "Examination of the glands displayed the typical histological structure of a tuberculous lesion." (Report from Dr. Eastes' Laboratory of Pathology.)

Since the operation a fortnight ago the patient has been suffering from paresis of the right sympathetic, manifested by the following symptoms: pseudo-ptosis, enophthalmos, and contracted pupil. There has been free discharge from the abscess, but this has considerably lessened during the past three days, and the swelling in the pharynx has greatly decreased.

Dr. George Thompson kindly saw this case with me yesterday, and considers that the paresis will probably gradually clear up.

The case is shown for the purpose of ascertaining the opinion of members as to whether in these cases, independent of spinal caries, the abscess should be opened through the mouth or by the external route.

The PRESIDENT: Many cases are properly opened at the side of the neck, but in young children there is no occasion, when the abscess seems to be pointing in the pharynx, to open it in the side of the neck. It is easy to put the child on its side and open the abscess, allowing the pus to flow quickly to the front of the mouth. I remember being fetched, one night, some miles to do tracheotomy on a child, and found it in this condition. By the use of sinus forceps the abscess was evacuated with extreme ease by putting the child on its side for a time, and rolling it forward on its face as soon as the pus came. Where there is no urgency and it is not pointing in the front, it is well to open from the side.

Mr. CLAYTON FOX: I should like to ask whether this is really a retro-pharyngeal abscess. Retro-pharyngeal abscesses usually arise either from tubercular disease of the retro-pharyngeal lymphatic glands or spine. These glands atrophy by the fourth year of age. In this instance the patient's age is twenty-five. May it therefore not have been a latero-pharyngeal abscess, which pointed in the pharynx?

Dr. DAN MCKENZIE: The question asked by Mr. Fox is important, because it raises the further question of treatment. In acute retro-pharyngeal abscess I think opening through the mouth is perfectly satisfactory: there is no need to operate through the side of the neck. But in lateral pharyngeal abscess in the deep cervical glands, the pus may track along until it finds its way out, and such an abscess can be opened from outside. When there is bone disease the abscess should be opened in a position where it can be kept aseptic; thus, when there is bone disease, the abscess should not be opened through the mouth. But in tuberculosis of the retro-pharyngeal glands the operation can be safely and easily performed through the mouth, the abscess being opened and curetted. I showed cases of this kind before the Section a few years ago.

Dr. DUNDAS GRANT: I have seen retro-pharyngeal abscess in two adults opened through the mouth, with excellent results. These abscesses, which are not common in adults, were not due to vertebral disease; they seemed to have arisen from exposure to cold.

Dr. IRWIN MOORE (replying to Mr. Fox): There were two or three glands in the neck along the posterior border of the sternomastoid which I removed, and they were tubercular. It is possible that the abscess is secondary to infection of a deep cervical gland.¹

Syphilitic Disease of the Larynx.—Irwin Moore.—H. L—, female, aged thirty-eight, shown at the December meeting as a case of doubtful malignant disease of the arytaeno-epiglottic fold and ventricular region of the left side of larynx—now found to be syphilitic.

A short history of the case is described in the *Proceedings* of this Section for January, 1916.² The left vocal cord was almost entirely concealed by a smooth round swelling of the arytaenoid epiglottic fold and

¹ On May 7, i.e. seven weeks following the operation—all discharge had ceased, the swelling in the pharynx had disappeared, and the external wound in the neck had closed. The paresis of the sympathetic (pseudo-ptosis, etc.), though somewhat better, has not yet cleared up.

² See JOURN. OF LARYNGOL., RHINOL., AND OTOL., April, 1916, p. 148.

ventricular band. There were complete paresis of the left vocal cord and fixation of the arytenoid, with marked hoarseness, difficulty in swallowing, and considerable pain on palpation of the larynx, due to perichondritis. The patient had lost 2 st. in ten months. Some opinions were expressed that the case was malignant, whilst others thought that it was tubercular. As the patient's condition remained *in statu quo* for two months and did not respond to treatment with potassium iodide and mercury, Mr. Wilfred Trotter was asked early in January to see the case, and he expressed his opinion as somewhat in favour of malignant disease.

A portion of the growth was removed on January 11; microscopical examination revealed some inflammatory reaction just beneath the surface epithelium, superficial to the numerous glands, and Dr. Eastes' report stated that it was non-malignant.

At the end of February the patient was admitted to hospital with well-marked stridor due to increasing swelling of the growth. A tracheotomy was therefore performed under local analgesia. At the operation the thyroid isthmus was found to be fibrous and firmly attached to the trachea. It was separated with difficulty and divided; the left lobe was also fibrous and found to contain a caseated cyst which had the appearance of a broken-down tubercular nodule. There has been no variation in temperature. The chest was thoroughly examined, but no physical signs suggesting tuberculosis were found. The sputum was slightly purulent, but no typical bacilli were found in it. The blood, however, gave a positive reaction to the Wassermann test.

On March 22, 10 c.c. galyl (25 cgr. strength) were injected into the right median basilic vein. The three following days the patient complained of muscular pains in the right forearm, neck, scalp, and back of the eye with some dimness of vision, and these symptoms still continue. Dr. George Thompson kindly examined the patient yesterday, and reports that the optic discs were quite normal, and that the condition must be attributed to a toxæmia affecting the muscles of accommodation, probably not in any way connected with the galyl. With these exceptions the patient has improved daily. All pain on palpation of the larynx has disappeared. The swelling in the larynx has become considerably reduced, more of the left vocal cord can be seen, and the hoarseness is much less marked, though the cord is still immobile.

The case is of interest in showing the difficulties in diagnosis which such affections of the larynx may present.

Postscript.—In view of the marked benefit derived from the galyl injection, a further dose of 10 c.c. (25 cgr. strength) was given a month later, *i. e.* on May 14. This was followed by a severe and alarming attack of arsenical poisoning from which the patient only slowly recovered. Marked improvement in the larynx followed the second injection, and the patient has been able to breathe through the natural passage with her tracheotomy tube corked, since May 23. The swelling in the larynx, though reduced sufficiently to allow full exposure of the left vocal cord, still narrows the glottis to some extent, and the cord is still fixed. Patient has therefore been advised to retain the tube a few weeks longer for safety, while treatment with Ki. and Hg. is being carried on.

(?) **Nervous or Functional Aphonia.**—**L. H. Pegler.**—Patient, a soldier, aged thirty-nine, lost his voice for about sixteen days, fifteen months ago; it returned spontaneously, and he retained it till nine weeks ago. He has served in Africa and India, but not in the present war, and as a home service man he was on garrison duty at Stratford Camp when

his voice left him again. On admission to hospital he had a cough, a feeling of tightness in the throat, and a good deal of nasal obstruction owing to a very marked deflection of the septum with an ascending spur in the left fossa; there was also much chronic rhinitis with sticky secretion. The fossa are clear now, after submucous septal resection and reduction of the right inferior turbinal. The vocal cords have the appearance common in chronic laryngitis of long standing, being reddish, rounded, and rough on the surface; there is some asymmetry of the two cords and arytenoids, and thickening of the interarytenoid space.

When the man is asked to phonate, the cords hesitate in adduction and fail to approximate fully, a bowed interval sometimes intervening, while at others the glottis assumes some other shape; in fact, it varies at different sittings, but there is always a sudden occlusion of view through the closing down of the epiglottis with a kind of snapping action. The voice has improved a little at times, but the cough is always phonic. The physician in charge reports absence of chest signs, tubercle bacilli, or temperature; he has not thought the Wassermann test necessary.

THE PRESIDENT: In this case the cords seem to be at different levels and of different widths, and there is a little thickening of the brim. I doubt whether it is nervous aphonia.

DR. JOBSON HORNE: This makes an interesting addition to the series of cases we have seen during the war, which have been labelled functional or nervous aphonia without the cause having been ascertained. In this case I agree with the President that the condition does not suggest nervous aphonia; it has the appearance of laryngitis, because the arytenoids are swollen and the cords reddened and fleshy-looking. I think the condition is due to the man's work; he has been guarding the worst-ventilated tunnel on the South-Eastern Railway; after a train has passed through, the suffocating fumes irritate his larynx. The appearance is like that seen in men who have been "gassed" at the front. If he has complete rest of the voice I think he will make a good recovery.

DR. DUNDAS GRANT: There is here sufficient laryngitis to cause slight hoarseness, but not loss of voice, and anything beyond the hoarseness I think is due to a functional condition. He has not been exposed to shell shock, and probably does not wish to be. There is a disturbance of the cortical centre for phonation to such extent that there is an interruption to the transmission of stimuli. In the case of aphonia which Dr. Jobson Horne brought, the aphonia had disappeared by the time we examined him.

MR. CLAYTON FOX: I made out that there was decided thickening of the arytenoids, especially the left. With regard to the dysphonia, the swelling of the mucosa and involvement of the muscles are sufficient to account for his difficulty in phonation. He admits that he sweats at night, and I am suspicious of tubercle. I should like to know whether the Wassermann reaction has been taken, and think his sputum ought to be frequently examined. The chronic laryngitis can in great measure be accounted for by long-standing nasal obstruction.

DR. PEGLER (in reply): I have noted the difference in appearance of the cords and the slight asymmetry of other features of the larynx just mentioned by the President. As regards Dr. Jobson Horne's point about the presumed ill-effects of the tunnel fumes on this patient it was the former attack that followed exposure to this agent when the voice both left and returned suddenly. I admit the degree of chronic laryn-

gitis still present, but the dysphonia and some of the vagaries of the functional type are superadded. I may say that two of our best authorities, who have left the meeting, regarded the case as one of typical functional aphonia, but Dr. Douglas Grant's lucid observations upon it so completely embody my own views that I need only refer to what he has said for a just expression of them.

Abstracts.

PHARYNX.

Stout, P. Samuel.—Papilloma of the Uvula.—"Laryngoscope," 1915, p. 88.

Female, aged fourteen (coloured), noticed five months ago that something went down her throat when she swallowed and came up again when she hawked, coughed, or gagged. It did not seem to interfere much with talking or eating, but of late when she coughed it up it would fly out and strike her front teeth, and at times even came out between her teeth. Examination showed a mass hanging to the end of a very long uvula. The mass was as large as an almond. It was removed under local anæsthesia, and had not recurred at the end of one year.

J. S. Fraser.

Goldstein, Max A.—Angioma of the Uvula.—"Laryngoscope," 1915, p. 90.

Female, aged twenty-five, about eight years ago felt a roughness of the throat near the base of the tongue. Later there was difficulty in nasal respiration. Three years ago deglutition became impaired. Examination showed a tumour of the uvula of sufficient size to impair speech and to cause frequent regurgitation of fluid through the nose, and to excite a more or less constant short cough. The uvula was enlarged, tortuous, and mottled blue-red. The most pronounced varicosities were at the tip, but they also extended into the soft palate. On palpation the tumour was indurated and nodular. It was successfully removed under local anæsthesia.

Operation.—A widely curved uterine hæmostat, the distal end of which was shaped something like a pot-hook, was clamped well above the upper tortuous vessels. A large aneurysm needle, threaded with strong silk, was passed from behind through the palate and two ligatures firmly tied on either side, the outer curve of the clamp forceps preventing the slipping of the ligatures. With a bistoury curved on the flat the tumour was removed, using the lower curved edge of the clamp as a guide. The clamp was left in position for several hours, and the sutures were only removed on the third day. There was absolutely no deformity of the soft palate after the operation, and no recurrence after five years. Speech was perfectly normal.

J. S. Fraser.

NOSE.

Gundelach, C. Armin.—Posterior Nasal Operation by means of the Nasopharyngoscope. "Laryngoscope," 1915, p. 83.

Examination of the posterior region of the nose with the nasopharyngoscope gives us a comprehensive idea of our intranasal surgical technique.

Gundelach has examined the results of operations on the posterior ethmoidal and sphenoidal sinuses. In the latter he can make out the marking of the Vidian nerve on the floor of the sinus. The marking of the second division of the fifth is often quite plain, appearing as a welt on the lower half of the outer wall. The optic canal, when it presents in the sinus, appears in the upper outer angle. The writer remarks that considerable practice is necessary in order to get a correct interpretation of the anatomical markings. In one case, in which the patient's vision was rapidly failing, Gundelach saw an inflammation in the sphenoidal sinus localised to the optic canal. The condition rapidly improved, but a subsequent coryza reinfected the same area and the acuity of vision again decreased. The writer has also observed polypoid degeneration of the sphenoidal mucous membrane at the time of operation.

J. S. Fraser.

Williams, A. W.—Granulosis Rubra Nasi. "Proceedings of the Royal Society of Medicine, Dermatological Section," November, 1915, p. 20.

The case was that of a girl, aged thirteen, who had suffered from a condition of granulosis nasi since early childhood. Her nose was red and the skin wet with sweat. There were hyperidrosis and lumpy swellings in the arm-pits. The hands and feet were cold and moist.

The localised hyperidrosis of the cartilaginous part of the nose was very marked until about two months ago. A few deep-seated papules gave the appearance of something between a hydrocystoma and lupus.

The author is of opinion that recovery usually takes place at about the age of puberty.

Archer Ryland.

ŒSOPHAGUS.

Friedberg, Stanton A.—Œsophagoscopy. "Annals of Otology," etc., March, 1914.

The author believes that foreign bodies in the upper end of the œsophagus are apt to be missed because the cricoid keeps the end of the tube pressed against the posterior wall. The tube therefore passes behind the foreign body. (This is not the experience of the abstractor, who has found that the difficulty is exactly the reverse, and that it is necessary to be careful not to let the tube pass in front of the foreign body.) Friedberg notes that in children with a foreign body in the gullet the cheeks and lips are distended on account of the accumulation of saliva in the mouth, owing to the child's unwillingness to swallow. The author gives an account of numerous cases, the second of which had a fatal result due to previous blind efforts at removal of the foreign body before Friedberg saw the case. In another case the foreign body was not observed at the first examination on account of œdema. At a subsequent examination the foreign body was found embedded in the right pyriform fossa. Case 10 was that of a child who had swallowed an ivory button which was not revealed by a skiagraph, as it was made of vegetable ivory. In Case 14, a boy, aged three, a nickel and two pennies were removed from the œsophagus at the same time, as they were all stuck together.

J. S. Fraser.

EAR.

Coates, E. M.—The Vaccine Treatment of Suppurative Otitis Media. "Annals of Otolaryngology," etc., xxiv, p. 785.

The author's deductions are admittedly optimistic—"a certain allowance," he says, must be made "for the rose-coloured spectacles" he "may be presumed to be looking through."

His cases are considered under two headings: *Acute* and *Chronic*. He warns the reader not to give vaccines too much credit in the former, since many cases get well without them. But he prefers to use them than to follow Heath's advice. In the chronic cases vaccines are most valuable as an adjunct to the mastoid operation. In 46 cases, 39 dry ears were obtained by the use of commercial mixed vaccines, with an average of 5 doses.

MacLeod Yearsley.

McBean, Geo. M.—Theories Concerning Paracacus Willisii. "Annals of Otolaryngology," etc., xxiv, p. 874.

The author thinks that, from the variety of opinion, there is room for at least one more theory. He reviews the literature on the subject and remarks that Heath's theory is unsupported by tuning-fork tests and unlikely to find many who will agree either with his premises or conclusions. In this review McBean appears to have overlooked the comparatively simple explanation offered by Siebenmann that, in middle-ear deafness low tones being worse heard, surrounding noises are less apparent to the deaf than to the hearing, and that the latter unconsciously raises his voice and is so better heard. The author, apologising for his temerity, advances a hypothesis of his own, built on grounds which have been widely accepted by otologists and physicists. Briefly stated, it is this: The lymph in the cochlea is in a state of perpetual movement, and low-pitched sounds have the greatest amplitude of vibration. When ankylosis of the stapes is present the low-pitched sounds are lost. Hence, since the normal relation of the tectorial membrane to the hair cells must be in a moving fluid, and these nerve terminations must therefore be in a certain state of tension, stapes ankylosis stops this motion and the relation of the tectorial membrane is no longer normal, so that the auditory nerve is less capable of responding to sounds. In the normal ear the function of the membrana secundaria is a passive one, but when the normal agent for producing motion in the cochlea fluids (stapes) is ankylosed, it assumes a more active rôle, and requires a greater stimulus to do this.

MacLeod Yearsley.

Jobson, G. B.—Contra-lateral Otitic Brain Abscess.—The Ocular Symptoms of Brain Abscess and Sinus Thrombosis. "Laryngoscope," p. 7, 1915.

Jobson holds that the absence of ocular symptoms does not justify the exclusion of intracranial involvement, but nevertheless considers that they are of great value. Some ophthalmic surgeons hold that the changes in the disc are due to engorgement and that the increased intracranial pressure projects the cerebro-spinal fluid into the inter-vaginal space, with sufficient force to constrict and strangulate the nerve and vessels, and that œdema of the papilla is the result. The holders of this view, further, point to the rapid subsidence produced by decompression operation.

On the other hand, Hughlings Jackson, Gowers, and others hold that choked disc and optic neuritis are inflammatory, and that they are

produced by metabolic substances projected into the cerebro-spinal fluid of the intervaginal space. Recently these two theories have been combined.

In cases of brain abscess there are three stages: (a) The inflammatory or febrile stage, when the affected patch is in the stage of red softening and the symptoms are those of irritation. This stage lasts from a few days to a week, and is usually preceded by stoppage of aural discharge. There is no optic neuritis and the pupils react normally. (b) The manifest or early purulent stage is due to pressure and accompanied by lowering of the mental and physical functions. Optic neuritis develops and advances rapidly. It is usually more apparent on the diseased side. Choked disc is more often seen in cerebellar abscess than optic neuritis. The pupils are sluggish. (c) The terminal or paralytic stage is one of pressure combined with great toxæmia, and is associated with coma and sometimes with convulsions. Optic neuritis may be intense, and the pupils are quite insensitive to light. If the pupils are unequal the abscess will probably be found on the side of the more widely dilated one. Pupils contracted and insensitive to light indicate that the disease is in advanced stage. Jobson states that optic neuritis requires at least ten days for its development. Its absence does not negative cerebral abscess. Its value as a symptom is that if present only on one side, or more marked on one side, that side is probably the seat of the lesion. This rule, however, is not absolute. When the abscess is situated beneath the tentorium, choked disc is more frequent and severe than when it is located in the cerebrum.

Eye changes occur in about two-thirds of the cases of otitic sinus thrombosis. If the thrombus extend to the cavernous sinus the eye-ball on the affected side will be chemosed and proptosed, the pupil dilated and fixed, and the cornea dry and hazy. The lids of the affected side become cedematous.

Jobson records the following case: Female, aged twenty-eight, chronic fœtid O.M.S. on *left* side with mastoiditis; temperature 99.4° F. Extradural abscess in middle fossa and also a perisinus abscess; sinus opened but not thrombosed. Four days later, temperature 103° F.; chill and pain in neck. Jugular exposed and found thrombosed. Case did well till one month later, when patient complained of pain on right side of head, temperature 100° F., pulse 120. Mental condition that of irritability alternating with dulness. Choked disc present on left side, and next day eye became chemotic and proptosed, with dilated pupil. Right eye normal. The left temporo-sphenoidal lobe was explored with negative result. Two days before death there was commencing left hemiplegia, and the right pupil was dilated and fixed. A cerebral abscess on the right side was suspected, but the patient was too ill for operation. The *post-mortem* showed an *abscess of the right temporo-sphenoidal lobe* with fœtid pus. Jobson holds that the abscess was probably due to metastasis. The left cavernous sinus was normal, and the right ear was perfectly healthy.

J. S. Fraser.

MISCELLANEOUS.

Freundlich, David Bernhardt.—Co-operation of the Otologist and Rhinologist with the Dentist.—“Laryngoscope,” 1915, p. 40.

Freundlich states that according to Lermoyez, pathological conditions of the maxillary antrum are more often of dental than of nasal origin!

Bayer, of Brussels, and Gruenwald also appear to hold that antral suppuration is usually of dental origin! Ingersoll, of Cleveland, reports a case in which there was persistent neuralgia over the right antrum, though the teeth were all in good condition, and the nose was normal. The patient died of pneumonia, and autopsy showed a fairly well-developed molar tooth in the posterior wall of the right antrum, just above the floor. The crown projected into the antrum, and the roots were embedded in the antral wall. A good radiogram would have revealed the condition and so brought about a cure. As a rule antral cases of dental origin showed decayed roots, pyorrhœa, or an "abscessed" tooth, but in others the exact condition is only disclosed by the X rays. Freundlich also mentions broken roots, mal-posed wisdom teeth, or growths on the root. In cases of adenoids the teeth are the victims and not the offenders, and the modern skilled dentist sends such cases to the throat surgeon for treatment. Freundlich records the following cases: (1) Female, aged ten, who had earache at intervals. Ear normal. Freundlich's examination showed an inflammation of the pulp of the lower left first molar, though the tooth contained a large filling in good condition. The writer reluctantly extracted the tooth, with good result. Case 2: Female, aged thirty-five, had empyema of the antrum. The pulp of the first upper left molar was found to be badly decomposed. After extraction of the tooth and treatment by the rhinologist the empyema cleared up. Case 3: Female, aged twenty, had a painful sore throat which did not yield to treatment. Examination showed an erupting mal-posed wisdom-tooth, from the socket of which pus oozed. The tooth was removed, and within ten days the condition subsided. Case 4: Male, aged twenty-nine, complained of intermittent earache. A radiograph showed a well-defined area of alveolar abscess around the mesial root of the first molar.

J. S. Fraser.

Edwards, J. G.—A Calculus in Submaxillary Gland. "The Medical Journal of Australia," January 1, 1916.

The patient was a man, aged forty-one. He had a swelling under the ramus of the jaw about the size of a hen's egg. The swelling was very tender, and the patient had suffered a great deal of pain. Pus was seen exuding from the papilla of Wharton's duct. The anterior end of the duct was slit up to provide a free escape for pus. A probe introduced along the duct felt a gritty substance which was very elusive. At times it could not be felt at all. A skiagram very clearly showed the presence of a calculus. A. J. Brady removed the submaxillary gland by an external incision. The gland tissue was very hard and scirrous like. An abscess cavity in the centre contained a spherical smooth calculus like a pearl from a lady's ring. The floor of the mouth was not opened, the duct was slit up on a director, and the larger rough calculus situated where the duct joined the gland was removed. Skiagram very useful to confirm diagnosis. Recovery complete.

A. J. Brady.

Grey, E. G. (Boston).—Studies on the Localisation of Cerebellar Tumours: II. The Pointing Reaction and the Caloric Test. "Amer. Journ. Med. Sci.," May, 1916.

This paper is based on an analysis of thirty-one cases of cerebellar or extra-cerebellar tumours which were examined by means of the pointing and caloric tests. The diagnosis and localisation of the lesions were confirmed in all of the cases either at operation or on *post-mortem* examination. It was found that in most of the patients having cerebello-pontine

new growths and in certain of those with tumours of one or other hemisphere the reactions were sufficiently characteristic to be of supplementary value in localising the disease. In other cases with intra- or extra-cerebellar tumour, on the contrary, the results were often ambiguous and afforded no assistance in establishing a diagnosis. In many instances, indeed, the conclusions drawn from these results were actually at variance with the other physical findings, and had much reliance been placed on them would have led to error. Several factors are probably responsible for the occurrence of atypical reaction in patients with cerebellar tumours. In the author's opinion the two most important are, first, the greatly increased intracranial pressure due to internal hydrocephalus, and, second, the diffuse nature of many of the tumours.

Thomas Guthrie.

Randall, B. A., and Jones, I. H. (Philadelphia).—The Ear-tests of Bárány in Locating Cerebellar and other Encephalic Lesions. "Amer. Journ. Med. Sci.," April, 1916.

This paper is the outcome of work done in the Department of Neuro-otology, recently created in the University of Pennsylvania. In the past eighteen months 125 pathological cases have been investigated in the Department, and of these 18 have been submitted to operation and 4 have been examined *post-mortem*. These sections, *ante-mortem* and *post-mortem*, have shown the deductions from the ear examinations to have been remarkably accurate. Most stress is laid in this paper on the pointing reactions, which have far surpassed the nystagmic in value and importance.

The writers have come to the conclusion that all pointing reactions are primarily cerebral, and not, as generally stated, cerebellar. Yet they are achieved through the synergising action of the cerebellum. With the cerebral mandate is associated the cerebellar influence, muscle sense, arthro-dial sense, tactile, auditory, and visual impressions, and memory. The pointing reactions are, in fact, dependent on so many things that a complicated are must be assumed to explain them. The writers postulate and give proofs of a "subjective circuit" through the cerebellum to the higher centres. They also claim that each semicircular canal has an entirely separate tract of its own, and this they have proved in the case of the horizontal and superior canals in a series of 28 cases.

In conclusion, they affirm that by means of these ear tests "we can usually distinguish lesions of the labyrinth from those of the cerebellum; we can always tell when the eighth nerve is diseased; we can say positively whether or not the posterior longitudinal bundle is affected; and we can detect a lesion of the cerebellum, but cannot always locate it."

Thomas Guthrie.

OBITUARY.

SIR VICTOR HORSLEY, C.B., F.R.C.S., F.R.S.

THE premature death of Sir Victor Horsley is the greatest loss medical science has so far sustained in this horrible war. Though not slain in battle he fell like a soldier on the post of honour he had selected. With that utter disregard of himself which he had shown throughout life he had no sooner heard of the insanitary conditions prevailing in

Mesopotamia than he volunteered for the post of Consultant in that deadly climate. There he succumbed to heat-stroke on Sunday, July 16th, 1916, in the fifty-ninth year of his life.

Many have been since the sad event the voices of those extolling Horsley's merits. Nor is this to be wondered at. So great have been his achievements in the divers fields of anatomy, physiology, pathology, neurology, surgery, and social progress that each of them would suffice to secure undying fame to the departed friend. Indeed, not a few of those who most strenuously combated his politico-social views will, after the experiences made in this war, admit that his foresight was greater than their own. Nor do I doubt for a moment that the scientific repute of Victor Horsley, great as it is amongst his contemporaries, will continue to increase until he will be recognised as one of the rare geniuses of the medical profession.

Better qualified pens than my own have already paid tribute to Sir Victor's outstanding merits as a general physiologist and daring surgeon. To me it is only left to register what he has done for laryngology, and mournfully to lay down at his bier the thanks of our community. The Editor of the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY has kindly desired me to deliver our "Vale," and adds that there was no one more fitted to do so than myself. In a certain sense that is true: for more than thirty years I have been united with Victor Horsley by intimate friendship, and with the exception of his "Note on some of the Motor Functions of certain Cranial Nerves, etc." (*Proc. Roy. Soc. of London*, vol. xlv, 1888), which he wrote in collaboration with our mutual friend, the late Dr. Charles Beevor, and in which the authors endeavoured to show that the soft palate, the uvula, the levator palati, and the pharyngeal constrictors were innervated by the spinal accessory nerve—all Horsley's laryngological work has in some way or another been linked with my own. This will explain and excuse, I trust, why my task is not undertaken in the shape of the cool and impassionate survey of an independent observer. It is conceived in the spirit of ardent love and admiration; and, furthermore, it has to be, to some extent, autobiographical, since our whole joint work dates from our close personal association. To characterise its nature, I cannot do better than quote the sentence from Horsley's obituary notice in the *Times*: "It was his generous custom to invite other workers to his laboratory and to place his services at their disposal; he would carry out all the delicate manipulations necessary at the request of any colleague, and would then resign to that colleague all the credit of the work accomplished." This description literally applies to our joint work.

Already, when publishing in 1881 my first paper on the greater vulnerability of the abductor fibres of the recurrent laryngeal nerve in progressive organic diseases of its centres or trunk I had arrived at the conclusion that clinical observation and pathological anatomy, though they established the existence of this phenomenon, were unable to explain its cause. Hoping that experimental research might advance such an explanation, and unacquainted with the technical difficulties of this course, I obtained permission to undertake the necessary studies in a London physiological laboratory. So long as the results of exclusion of the activity of certain nerves had to be investigated all went well. But when I came to study the effects of electric stimulation of intact laryngeal nerves I obtained most contradictory results. Repetition of the experiments undertaken in different species of animals only increased the difficulties. The authorities of the laboratory, whose aid I invoked,

were unable to shed light upon the irreconcilable results. Ultimately I was driven to the conclusion that the method I had been advised to employ (use of Ludwig's clamp-electrode) was faulty, and this conviction was confirmed by a physiologist who had himself worked a great deal in this line, and who explained to me that my results had been vitiated by spread of the electric current to neighbouring nerves. I had thus learned, by unpleasant experience, that in order to obtain reliable results for the performance of these delicate experiments not only zeal but technical experience were indispensable, and after several months thus simply lost I gave up my—mostly fruitless—endeavours in 1882.

In November of the following year, in a discussion on myxœdema, held in the Clinical Society of London, I suggested that myxœdema, Kocher's "cachexia strumipriva," and cretinism merely represented different phases of one and the same pathological process, and that they all were due to loss of the function of the thyroid gland, which at that time was commonly supposed to have no function at all. My proposition was simply derided. But when I returned to the charge at a meeting of the same Society in October, 1884, and showed that in a case of removal of a goitre in a young boy, the joint symptoms of myxœdema and cretinism had supervened, my statement was received in a very different spirit, and a committee was appointed to investigate the whole question of myxœdema and its allied morbid conditions. Amongst the members of that committee were the youthful Mr. Victor Horsley, who was at that time already known to be engaged in experimental study of this subject, and myself. It was at one of the meetings of this committee that I made Horsley's acquaintance.

I had looked forward with keen interest to this occasion. Although he had only recently graduated, and had only been appointed Assistant Surgeon to University College Hospital in 1885, his physiological and surgical work had already attracted general attention, and he was universally looked upon as "the coming man." My anticipations were not belied. From the first moment I felt irresistibly attracted by the handsome young man with the Apollo-head on a stalwart body, and with the frank expression of his intellectual, amiable face. Our liking seemed to be mutual. He invited me to come to the Brown Institution, to which he had been appointed Professor Superintendent in 1884, and to follow the progressive myxœdematous changes in monkeys whose thyroids he had extirpated. To-day it is a historical fact that by these experiments he definitely proved that myxœdema was caused by the loss of that organ, and that by his suggestion of grafting the thyroids of sheep into the abdominal cavities of patients suffering from that disease—though this method was subsequently superseded by feeding, on Murray's suggestion, the patients with thyroid extract—he laid the foundation of modern organotherapy.

During one of my visits to the Brown Institution Horsley began to talk to me about my neurological work, with which he showed himself surprisingly familiar. I told him of my experimental failures, and added that they were the more regrettable, as Krause lately had endeavoured to imitate the pressure of a growth upon the recurrent nerve by attaching a piece of cork to the recurrent laryngeal nerves of dogs, and that he had on the strength of his results advanced the surprising theory that the median position of the affected vocal cord in cases of progressive organic lesion of the corresponding motor nerve was not due to greater vulnerability of its abductor-fibres, but to a primary neuropathic contracture of all the muscles supplied by that nerve. These experiments, I felt sure,

imperiously demanded repetition in order to ascertain whether the original process and the imitation were identical processes or not.

Horsley replied that he had been particularly interested in a discussion which had taken place between Krause and myself on that topic at the International Medical Congress of Copenhagen in 1884, and to my equal surprise and delight offered me there and then, not merely to repeat Krause's experiments and to resume my own original experimental research, but to investigate with me the whole representation of the larynx in the central nervous system! Need I say that I most gratefully at once accepted this generous offer?

Thus begun our collaboration. It lasted uninterruptedly from 1886-1890, and was resumed for a short time in 1893 and again in 1897. I look back upon this association, in which Horsley undoubtedly took the lion's share, as one of the greatest scientific privileges of my life. The number of our experiments during that time exceeded one hundred, performed on different species of animals (monkeys, dogs, cats, rabbits), and the nature of the experiments undertaken extended to:

- (1) Repetition of Krause's experiments of compression of nerves.
- (2) Repetition of Frank Donaldson's experiments. (Greater excitability of abductor muscles by weak electric currents.)
- (3) Repetition of Franklin Hooper's experiments. (Peripheral and differentiating effect of ether upon the laryngeal muscles.)
- (4) Repetition of Jeanselme and Lermoyez' experiment. (Loss of excitability of laryngeal muscles after death.)

(5) Investigations, so far as the larynx is concerned, of the functions of:

- | | |
|-------------------------|-----------|
| (a) Spinal accessory | } Nerves. |
| (b) Vagus | |
| (c) Superior laryngeal | |
| (d) Median laryngeal | |
| (e) Recurrent laryngeal | |

- (6) Investigation of action of crico-thyroid muscles.
- (7) Width of glottis after section of both vagi nerves below origin of recurrent laryngeal nerves.
- (8) Excitation of cortex cerebri.
- (9) Ablation of cortex cerebri.
- (10) Excitation of corona radiata.
- (11) Excitation of internal capsule.
- (12) Ablation of hemispheres.
- (13) Excitation of medulla oblongata.
- (14) Position of glottis after section of recurrent and of superior laryngeal nerves.

To work with Horsley along these partly just opened, partly entirely uncultivated, fields of science was a liberal education. To no one did the old saying "Familiarity breeds contempt" less apply than to him. With ever increasing admiration one watched the mental plan governing his whole line of research, his perfect surgery and marvellous ambidexterity, his scrupulous care and inexhaustible patience, his fertility of modifying, varying, and newly inventing methods of examination, his safeguards against falling into any of the fallacies in which experimental research abounds, the sobriety of his deductions, the clearness of his literary expressions. And what enchanted me more than all were those flashes of genius which, often quite suddenly and unexpectedly, gave an entirely new turn to our line of thoughts and allowed us to contemplate the subject under consideration in an entirely new light. Yet

all this was done without any affectation of superiority, done as simply and naturally as if it were self-understood. I learned to love Victor Horsley in these unforgettable years, the happiest ones, from a scientific point of view, I have ever spent.

Our work has been between twenty-five and thirty years before the profession. With few exceptions and additions its conclusions are still accepted as valid. It will therefore suffice if I briefly summarize its outcome.

In 1886 we published our first joint paper: "On an Apparently Peripheral and Differential Action of Ether upon the Laryngeal Muscles" (*Brit. Med. Journal*, September 4 and 11). In this it was shown—as previously discovered but left unexplained by Franklin Hooper—that ether exercises a peripheral, differentiating influence by means of the circulation upon the antagonistic groups of laryngeal muscles, and that, therefore, a difference in the metabolic processes of the abductor and adductor muscles appears to exist. Moreover, it was demonstrated that in all species of animals operated upon the abductor muscles, though individually the largest of all laryngeal muscles, lose after death their electric excitability long before the other laryngeal muscles.

In the same year I read my paper, "Abductor Paralyse, nicht Adductorencontractur," before the Deutsche Naturforscherversammlung at Berlin. In this I showed from very different points of view the fallacy of Krause's contention. The experiments which proved that Krause's cork-experiments were only superficially similar, but pathologically different, from the pathological process in man, were, with most ingenious variations, performed for me by Victor Horsley.

From 1886 to the end of 1889 we were busy with our experiments and did not publish anything concerning them. After we had published our results in a preliminary note, however, "On the Central Motor Innervation of the Larynx" (*Brit. Med. Journal*, December 21), Prof. Krause, who fancied that we had endeavoured to rob him of a priority which we had not only never contested but directly acknowledged previously, forced upon us a perfectly superfluous and absolutely unnecessary controversy (*Berliner Klin. Wochenschrift*, Nos. 4 and 7, 1890).

Shortly afterwards we had another much more scientific controversy ("Du centre cortical moteur laryngé et du trajet intra-cérébral des fibres, qui en émanent," *Annales des Maladies de l'Oreille et du Larynx*, Mai et Juin, 1890) with MM. Garel and Dor. These gentlemen maintained that a unilateral cortical lesion could determine a pure laryngeal hemiplegia on the opposite side. We opposed that notion on the strength of our own experiments and of clinical experience, and, although the statement has been spasmodically revived from time to time, I think that its untenability is nowadays generally admitted.

In the same year I published my paper, "On the Position of the Vocal Cords in Quiet Respiration of Man and on the Reflex-tonus of their Abductor Muscles" (*Proceedings of the Royal Society*, vol. xlviii). The paper is entirely my own, but it seemed desirable to ascertain by experiment whether respiratory impulses could be conducted rhythmically along the different fibres of the pneumogastric nerve to the respiratory centre, and there be changed into a tonic semi-innervation of the posterior crico-arytænoid muscles. The extremely difficult experiments—section of the vagi below the origins of the two recurrent laryngeal nerves—which were required to test my idea were performed by Victor Horsley, and went far to prove its correctness, though it was evident that the

impulses thus engendered cannot be the only ones reaching the respiratory centre in the medulla, and that this may also be influenced, so far as the larynx is concerned, through other afferent impulses.

Again, in 1900, a demonstration of the most important of our results concerning the representation of the larynx in the central nervous system was given by Horsley and myself before the combined Sections of Physiology, Neurology, and Laryngology of the International Medical Congress of Berlin. This demonstration resulted in a perfect ovation for Horsley, whose skill as an experimental physiologist was thus acknowledged by the most competent tribunal in the world. A short *exposé* of our results was given under the title "Of the Relations of the Larynx to the Motor Nervous System" in the *Deutsche Medicinische Wochenschrift*, No. 31, 1890.

Finally, the result of the greater part of our experiments during the preceding four years was published in the *Philosophical Transactions of the Royal Society*, vol. 181. The facts communicated in that paper did not, by any means, exhaust the material we had already then collected, and we intended to return to the subject. But when we resumed our studies in 1893, and when I found that their object was mainly to examine the results of descending degeneration following ablation of the higher parts of the central motor apparatus, I insisted, in spite of Horsley's friendly remonstrations, in withdrawing from an investigation which was above my ken, and in which I felt I had become more a hindrance than a help. That part of our task, therefore, was left unfinished.

Once more I had to have recourse to Victor's friendly services, in 1897. I had been denounced by Dr. Grossmann, of Vienna, for not having repeated Dr. Wagner's experiments on the position of the vocal cord after section of the recurrent laryngeal nerve. The charge was frivolous, for every experimenter, including Horsley and myself, who had performed that experiment and had published his work, had arrived at results totally different from Dr. Wagner's. To avoid the obvious retort, however, that we had neglected to test Dr. Wagner's statements, it became necessary to repeat these experiments. This Horsley did for me, and the outcome, a sample of which was fixed by photographic representation, utterly negated Dr. Wagner's results.

With this Horsley's work for laryngology ended. It represents an achievement for which our specialty can never be grateful enough to him. The foregoing small tribute does not nearly exhaust the amount of my personal indebtedness to him for thirty years' unbroken friendship, for unceasing encouragement, as well as for invaluable services rendered to my family. But it shows, I hope, that among the small number of general physicians, surgeons, and practitioners who supported British laryngology during its struggling period between 1860 and 1890, a place of conspicuous honour must be reserved for our friend, the late lamented Sir Victor Horsley.

Felix Semon.

CORRESPONDENCE.

THE RELATION OF NASAL CONDITIONS TO DEAFNESS.

To the Editor of THE JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY.

SIR,—Every reader will feel indebted to Dr. P. McBride for his excellent article in your August issue; it is not merely instructive as to the past and critical as to the present, but it contains much suggestion for the future.

May I be permitted to make a few remarks upon one of his sections—that relating to the relation of nasal conditions to deafness? It deals with a subject which comes continually before the otologist, and appeals especially to those who believe in what may be called the *preventive future of otology*.

Dr. McBride writes from an avowedly sceptical point of view. May not the whole secret of the relation between nasal conditions and deafness be summed up in one term—*defective nasal drainage*? To this may be added the effects upon the nose of chronic toxæmia, most frequently due to intestinal causes.

The effect upon the middle ear of a badly drained nose is quite simple and straightforward; secretions are hung up in the nasal chambers, undergo such alterations as to render them irritating, and collect in the naso-pharynx, where they act as a continual irritant to the pharyngeal and naso-pharyngeal mucous membrane. The nature of this alteration of secretion, whether microbic or chemical, can scarcely be discussed in a short letter.

The conditions likely to exist in the nose as a cause of defective nasal drainage are, I believe, mostly in connection with the septum. Bad deflections, especially those which result in a narrow crevice on the concave side, can very well hold up secretions. But bad deflections are likely to arrest the attention of the oto-rhinologist more readily than lesser degrees. I do not think that enough importance is given to those slight abnormalities which, lying close to the floor of the nose, show a very narrow cleft in that region.

Another nasal condition likely to lead to middle-ear deafness is the posterior bony spur, which, under certain conditions, may come into contact with the posterior end of the inferior turbinate. Such spurs are very frequently accompanied by enlargement of the posterior end. The latter condition is a common concomitant of septal growths and deflections, even of the minor kinds, and it is quite probable that they are due to the same irritation by altered secretions. When present, the glandular hypertrophy which forms an important part of them results in an augmentation of secretion which is prone to collect in the naso-pharynx, especially during sleep.

Your readers may remember that, in 1914, you were good enough to publish a short note of mine in which I suggested that the accumulation of altered nasal secretions on that side of the naso-pharynx which is lower during sleep, was responsible for determining which ear became first affected.

I have for some time past been consistently employing the Holmes electric naso-pharyngoscope in the examination of patients complaining of nasal and aural symptoms, and I have been much struck by the frequency of signs of chronic irritation of the Eustachian tubal orifices in the

conditions mentioned above. Such signs have given me the clue to appropriate treatment.

The effects upon the nose of chronic intestinal toxæmia also merit more attention than has been accorded to them. Many of the cases of varying turbinal hyperæmia (with or without accompanying septal abnormalities) clear up with remarkable rapidity when the toxæmia is treated. They are really instances of disturbed vasomotor conditions, and are often subjected to the tragedy of galvano-cauterisation.

I am, Sir, yours faithfully,

August 21, 1916.

MACLEOD YEARSLEY.

NOTES AND QUERIES.

PULMONARY SUPPURATION AFTER TONSILLECTOMY.

In the *Interstate Medical Journal* Dr. H. Wessler has published a skiagraphic study of the pulmonary inflammation due to aspiration, which sometimes follows tonsillectomy. He applies the term "lung suppuration" as more accurate than abscess or gangrene of the lung, which describe only a possible phase of the process. At the Mount Sinai Hospital, New York, he has examined with the X rays eight cases of pulmonary suppuration following tonsillectomy. These formed as high a percentage as 28 of all the cases of pulmonary suppuration observed in the same period. In all a general anæsthetic had been administered—a procedure which stands in close relation to the complication. After an incubation period of a few days symptoms of broncho-pneumonia begin. Later, evidence of suppuration—chills, high fever, and purulent expectoration—supervenes. In practically all the cases the sputum was foul at some time or other. This is some justification for the designation of gangrene of the lung, but the latter is a subordinate lesion. The putrefactive organisms usually cause small areas of gangrene, and as these are sloughed out the sputum becomes fetid. Periods of gangrenous sputum alternate irregularly with others in which there is no distinctive odour. Hæmoptysis is a very constant symptom, and varies from a slight brownish discoloration of the sputum to the expectoration of a pint of blood. Pain is frequent, and due to associated pleurisy. A predilection for the right lung was noted (six of the eight cases), and any lobe may be affected. The physical signs are frequently not distinctive, and are of the least value in diagnosis. As a rule, an area of dulness of varying extent is demonstrable with but few changes in the respiratory sounds, which are frequently diminished. In not one case were there signs of a cavity. There is evidently consolidated and poorly aerated lung, sometimes covered by thickened pleura. In six of the cases spontaneous recovery took place in from six weeks to five months. In one case recovery took place after two years—following excision of carnified lung. The remaining case is still unimproved. Skiagrams show an infiltration of the lung of varying extent. In five cases a cavity was demonstrated, in some with a fluid level which shifted on a change of position of the patient. The shape of the infiltrated area varied; in some a lobar distribution was seen: others gave the impression of a residual infiltration involving only the small portion of a lobe. Unless the lower lobe is involved there is no restriction of the movement of the diaphragm. When present, cavities are easily recognised as lighter areas of circular or elliptical shape within the shadow of infiltrated lung. In two cases they were multiple, and in two located at the hilus. When filled with secretion they may be invisible, but come into view after copious expectoration. The process of cure may be followed by the Roentgen rays. The infiltration gradually becomes less dense and fades at the periphery until it disappears, leaving perhaps a few thickened strands for some time. But clinical cure may be associated with persistence of the infiltration. Whether in such cases recrudescence follows cannot be said.

BOOK RECEIVED.

Throat and Ear Troubles. By Macleod Yearsley, F.R.C.S. With 12 Illustrations. London: Methuen & Co., Ltd. Price 1s. net.

THE
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UNPLEASANT POST-OPERATIVE PHENOMENA.

AT p. 437 of the present issue we publish the agenda paper of a recent meeting of the Laryngological Section of the Royal Society of Medicine, which was devoted to a discussion on "the complications following upon intranasal operations, and the influence of nasal sinus infection upon the moral and legal responsibility of the patient."

In order to prevent an unfair use being made of the information that might be given, the Council of the Section resolved that the names of contributors to the collection of cases should be withheld, and that neither the agenda paper nor the discussion should be published in the Transactions.

Perhaps it will not be considered out of place if we look into the reasons which led to the discussion being held, and if, at the same time, we show what has induced us to take the responsibility of publishing the reports in the JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY.

There is in many quarters a feeling, more or less freely voiced, that surgical mishaps ought not to be openly divulged lest their publication should deter surgeons from undertaking, and patients from submitting to, measures which in the main are known to be both safe and salutary. In many respects this opinion is sensible enough, but unfortunately there are in existence a certain number of people who take a grim delight in making our flesh creep. To all but the novice these eccentrics are, it is true, even more

amusing than their opposites who never make a mistake or meet with a mishap. But all the same, it is they who create the surgical bogey that keeps the youthful operator awake o' nights; such a bogey, to mention the first of a long list that occurs to us, as was the thyroidea ima artery of classical memory.

Thus the censoring of unwelcome surgical information has had the effect we are all too familiar with in other departments of life of generating rumours much more dismal than the truth itself. Every Congress *habitué* has vivid recollections of the triumph and hope of the morning being swamped in the gloomy confidences that follow the dinner at night. And hitherto, for the most part, it has only been in such private and confidential glimpses that the darker side of the picture has been shown to us. Now no one can regard such methods as being anything like so valuable and so true as a frank avowal would be in the hours of daylight and restraint.

Moderate statement of happenings, unsuccessful as well as successful, has two surpassing advantages. In the first place, proper emphasis laid upon difficulty and danger restrains impetuousness and develops skill. And in the second place, by inducing inquiry and investigation, discussions of this type ultimately bring about a reduction in the number and degree of risks, either by a modification of the operation concerned, or by its total abandonment when that step is seen to be advisable. The process thus counters the natural tendency in every surgeon to lose himself in the artist.

The history of our own specialty, like that of all other branches of modern surgery, bears eloquent testimony to the validity of these arguments. Spokeshaving the inferior turbinal for nasal obstruction, for example, is now practically obsolete; and the same may be said of the more recent radical frontal sinus operation of Killian as a routine remedy for frontal sinus suppuration. Both of those advances—for advances they undoubtedly are in the true sense of the word—we owe to the disclosure that the drawbacks and dangers of the procedures exceed in severity the diseases they were designed to cure.

In such stimulating effects the present discussion, although not revolving around any one particular method of treatment, will, we believe, prove to be equally fruitful. For instance, it is interesting to find that post-operative nasal meningitis is frequently associated with a visible defect in the roof of the nose; whether it be developmental or pathological is not yet quite clear—probably the latter. And there arise also for settlement important questions

about post-operative pneumonia. Is it any more frequent after nasal operations than after operations in other regions? Does it originate in shock; in exposure; in the inhalation of septic material; or in venous infection?

These are only a couple out of many other inquiries of equal or greater importance which spring to the mind as we read the reports of the cases, and it is, of course, by efforts to remedy the misfortunes which those reports describe that gaps in our knowledge are revealed and filled up, and further progress is made.

That being so, to allow the detailed records of such valuable cases and experiences to sink back into the rack of half-forgotten tales would be an unpardonable betrayal of the highest interests of our specialty. At all events, that is how the matter looks to us. And although in doing so we may appear to be ignoring the wishes of the Council of the Section of Laryngology, yet these reasons seem to us to be so overwhelmingly strong that we have decided to place upon permanent record the reports which appeared upon the agenda paper of the meeting.

As regards the discussion proper, no record was kept, and so it has unfortunately been lost.

D. M.

SOME REMINISCENCES, REFLECTIONS AND CONFESSIONS OF A LARYNGOLOGIST.¹

By JOHN NOLAND MACKENZIE, M.D.,
Baltimore, Md.

IN the seventies and early eighties of the last century, the Hospital for Diseases of the Throat and Chest in Golden Square, London, was the Mecca of the vast majority of English-speaking students of laryngology, who came there attracted by the reputation and engaging personality of Morell Mackenzie, then at the zenith of his professional career. Whether they went for study elsewhere or not, sooner or later their footsteps turned to Golden Square, either for passing curious observation or more serious and continuous work. The institution itself was a model of simplicity, both in architecture and equipment. In secluded isolation, it stood in the little square in the narrow zone which separates the throbbing, restless, rushing life of the metropolis from the poverty and squalor of the slums, and in a silence broken only in the

¹ Address delivered at the College of Physicians, Philadelphia, at a meeting of the Philadelphia Laryngological Society, March 7, 1916.

daytime by the roar of Regent Street, near by. The lower floor of the building, where most of the work of the hospital was done, consisted of a very large waiting-room—it had to be large to accommodate the then largest laryngological clinic in the world, an examination-room of ample size, but simply furnished, which, in turn, opened into a very much smaller and more private one, which was consecrated mainly to physical diagnosis. In the more capacious apartment were tables and lamps for the attending surgeons and chief of staff. The upper floor was occupied by the in-patients, and was always full. It was amid these modest surroundings, in picturesque contrast to the princely apartments and imposing apparatus of some of our modern up-to-date laryngological establishments, that many of the men who were destined to direct the after-progress of laryngology in Great Britain and America were not taught, but learned for themselves, the first lessons of their art. I entered on my duties as chief of staff in the summer of 1879. My predecessors in office were Felix Semon, Samuel Johnston of Baltimore, and Lennox Browne. I had qualified beforehand for the job, having acquired the *principia* of the subject in the old Metropolitan Throat Hospital in New York, in spare hours snatched from my service in Bellevue Hospital, and under the tutelage and inspiring example of my old friend, Clinton Wagner, one of the pioneers of the specialty in America and founder of the New York Laryngological Society. At that time, with all the enormous material at our command, there was practically no instruction given, except in the way of hasty demonstration of cases, and if the student or visitor learned anything, it was through close personal observation on his part and not through any gigantic effort to impart knowledge on the part of the medical staff. With one or two exceptions, the latter directed their attention almost solely to the larynx and thyroid gland, and the nasal passages were only examined when in quest of a polypus or when the attention was irresistibly attracted to these organs by the horrible stench of an ozæna. The nasal cavities were practically neglected, and the only apparatus in the hospital for the treatment of their diseases consisted of a pair of forceps for the removal of nasal polypi, and a handball atomizer with a detergent solution for the treatment of ozæna or any other miscellaneous disease of the nose that might irresistibly obtrude itself upon the recognition of the medical staff.

I have said that we concerned ourselves chiefly with affections of the larynx and thyroid gland. Let me pass briefly in review

our then treatment of some of these affections. Among our most frequent visitors to the clinic were cases of tuberculosis of the larynx. They literally abounded. They came by the hundreds, in striking and conspicuous contrast to the comparative rarity of this disease in the throat clinics of to-day. Many of them presented the classical picture first drawn by Morell Mackenzie, which we considered then pathognomonic of tuberculosis. It should be stated here that the grouping of signs, *turban* epiglottis, pyriform aryepiglottic folds, etc., so graphically described by Mackenzie, was not considered characteristic outside of England, and I must say that in my own observation I have never seen such constancy in the ensemble or grouping of appearances, either on the Continent or in the United States. At that time much difference existed among laryngologists concerning the value of laryngoscopic diagnosis in this disease. Ziemssen was the first to deny its certainty, and subsequently Heinze, and even Morrell Mackenzie, gave in their adhesion to his views. Lennox Browne, on the other hand, went to the other extreme, and declared that, with the exception of laryngeal growths, there is no disease of the larynx in which we may be so sure of laryngoscopic diagnosis. The partisans of both these views are too sweeping in their statements. There are many cases met with in practice in which the diagnosis must remain in doubt. I believe the case can be briefly stated as follows: The diagnosis of the lenticular ulcer, especially when single or unassociated with other tubercular lesions, is laryngoscopically impossible; even when the ulcers are multiple, and bilaterally situated on the cords or vocal processes, they can only be looked upon with suspicion in the absence of other signs of the disease. The same is true of the aphthous or diphtheritic ulcer. Even the ulceration which results from infiltration is not always typical in appearance, and may need the association of other tubercular lesions to proclaim its true nature. When infiltration is unilateral the diagnosis is sometimes shrouded in doubt, except when multiple ulceration has taken place. The association of the turban-shaped epiglottis with the pyriform swelling of the aryepiglottic folds is characteristic of tuberculosis, and should not be confounded with œdema, its closest simulator. It should here be remembered, however, that œdema may complicate the case and cause uncertainty as to its real nature. When to the characteristic infiltration of the epiglottis and aryepiglottic folds is added the typical worm-eaten superficial serpiginous ulceration, the grouping in the picture is pathognomonic. The typical laryn-

geal tubercular ulcer resulting from infiltration, in its development, appearance, and course does not resemble any other laryngeal disease with which I am familiar. The lesions of this—and this is true of many other diseases—may, of course, occur in atypical forms, the characteristic grouping may not be present, and the diagnosis may be left for awhile in doubt, but this does not invalidate the position that tuberculosis manifests itself laryngoscopically (in the larynx) in a manner different from any other known form of disease.

The subject may seem trite and superfluous, but I have introduced these remarks on the laryngeal picture in tuberculosis in order to emphasise the importance of the laryngoscopic or naked eye method of diagnosis (supplemented or not, as the case may be, by clinical phenomena) to the exclusion, if possible, of the microscope and the laboratory in the detection of disease in the larynx. In these days of unquestioning reliance on and faith in chemical and other strictly scientific as contra-distinguished from purely clinical aids in disease discovery, it is in many quarters at least fast becoming a lost art. As the introduction of the modern, direct methods of examination have done away largely with much of the old-time manual dexterity in intra-laryngeal and tracheal manipulation, so the common use of laboratory tests has, by opening up a lazier and easier road to diagnosis, greatly dulled the former diagnostic sense and diagnostic acumen. To overcome this unfortunate condition of affairs in the coming generation, the student should be shown as many cases as possible of a given malady, in order that the picture of the disease may be so photographed on his brain and embedded in his memory that he may be able to recognise it by sight alone when brought before its image in the mirror. Take him back to the old-time initiative in diagnosis, teach him to rely more upon his special senses, tell him that, after all, personal observation and clinical experience are less fallacious than the more artificial, although more strictly scientific methods, even though the latter may be, in many cases, indispensable, and in some ways more exact. It is only human to make mistakes. Let him not, therefore, in case of doubt, run to the laboratory at once for help, as is the rule in most cases to-day, but without in the least degree underestimating its inestimable value and assistance, let him seek it as the court of last resort. In other words, let him make the diagnosis with the naked eye alone; form his opinion in this way first, even though he may have to control it in the end by scientific tests.

The student should be schooled not only in the naked eye appearance of laryngeal disease, but also in what is even more necessary—early laryngoscopic diagnosis. The supreme and far-reaching importance of the latter ought to be evident to intuition, and the very mention of the subject in a company of laryngologists should be looked upon as a piece of gross impertinence; and yet, unthinkable and incredible as it may seem, to many workers in this special field to-day, whose vision does not carry beyond the tonsil, whose horizon is the palatal arcade, and whose ignorance of what lies beyond it is as boundless as the deep, it is a neglected or even unknown accomplishment. A fellow-laryngologist, an excellent man and a good surgeon, who had wasted a number of years out of what might have been a wholly useful life removing tonsils and doing submucous resection, when asked by a brother practitioner about the laryngeal appearance in one of his cases, exclaimed, "Larynx! I know nothing about the larynx!"

It is impossible to exaggerate the importance of the laryngoscope to the medical and surgical diagnostician in the early detection of disease, not only in the respiratory organs themselves, but, of equal, if not superior importance, in neighbouring and remote organs of the body. Long in advance of the appearance of classical signs and symptoms of disease in other organs it often points the way to grave disorder.

Not to multiply examples, how often is such a seemingly innocent performance as a lame or staggering cord in an otherwise apparently healthy individual the early herald of the existence of some formidable affection, such as malignant growth, central nerve disease or aneurysm, or a tiny moist or weeping ulcer on the vocal process, or a vegetation in the interarytænoid space, to the alert and practised eye the tell-tale, though silent, witness of tuberculous!

Every tumour of the larynx, no matter how benign it may appear, should be examined with the greatest possible care. Some of the most fatal diseases known to man make their first appearance in the larynx in the guise of great benignity. Thus the presence of cancer and tuberculosis in the individual is often first proclaimed by the discovery of an apparently simple papillomatous excrescence in the larynx. By the careful study of *every* case coming under our observation we will some day, among other things, clear up the mystery which surrounds the genesis of papilloma and approach more closely with the naked eye alone the earliest possible recognition of some of the most deadly diseases of the larynx.

One day a man was admitted to my division in Bellvue Hospital with the diagnosis of typhoid fever, but he presented an appearance which I had never seen in that disease. Not knowing what ailed him, I called the resident medical staff in consultation and the consensus of opinion was that, while his trouble was not such as had been diagnosed, it was impossible to classify it, to give it a name, as none of us had ever seen its like before. Janeway was summoned. "Acute ulcerative endocarditis." In view of the fact that there were no detectable morbid heart sounds present, the diagnosis was a brilliant one, and was verified by autopsy on the following day. At that time the disease was practically unknown, certainly not generally known, on this side of the Atlantic. I had read somewhere an abstracted account of the affection, taken from a French journal, but had forgotten it. In the absence, apparently, of heart trouble, how could you possibly make such a diagnosis, he was asked. "I don't know, but I have seen a case," was his reply.

The local treatment (of laryngeal tuberculosis) consisted in the use of hot and cold soothing and stimulating inhalations, the insufflation of an opiate, generally morphia, followed by a mixture of iodoform and starch and the use of the œsophageal tube to facilitate deglutition, and our one consoling thought was that we had placed our patient in a condition in which he would suffer the minimum amount of pain and approach the end, if possible, with resignation and an equal mind. All were doomed to die; the appearance of the disease in the larynx was the warrant of death. We did not know then that some of the very worst cases could be saved. It was not until years after that I had the truth of this latter statement brought forcibly home to me by the following case, which I take from several others quite as remarkable:

Mr. B——, a small, important little man, with an iron will, came from a distant city to consult me before going West for his health. He had a good-sized cavity in the left apex; both ventricular bands were the seat of broken-down infiltration, the ulceration covering both surfaces completely and extending into the ventricles. There was marked infiltration of the aryepiglottic folds (pyriform swelling), which had, however, not yet ulcerated. Physically, he was in very bad shape; was very weak, and in no condition to undertake even a short journey. I advised him to return to his home, give up his business (that of banker), and live in the open air, and on no account to attempt his trip to the West, as he might never reach his destination alive. It was Seneca who said that it is a part of the cure to wish to be cured. Well, this little man wished to be cured, and cured at all hazards. And he therefore did not take my advice. The next time I saw him, two years later, his chest cavity had become obsolete, the laryngeal infiltration had disappeared, and the ulceration had completely healed. He had gone to Colorado, pitched his tent in the wilderness, lived in the open air, and, as far as possible, in silence and in solitude, and during the entire absence from home had

taken no medicine, nor had he even laid eyes on a physician. Again, and against my advice, he returned to his former business. In six months ulceration broke out afresh in the larynx. This time I told him to take the fastest express to the West. To make a long story short, I saw him twenty-one years after his first visit to me. He was perfectly well, and, apart from the scars in the larynx, no one would have known that he had ever been hurt. Remember, this was not a case which happened yesterday or the day before, but long years before man had surrendered to Nature the care of tuberculous disease.

Among the cases of general and laryngeal tuberculosis which presented themselves for treatment there was a goodly company of the variety of laryngeal neoplasm, which I have called in my classification of the laryngo-tracheal neoplasms occurring in that disease, papillomatous excrescences, vegetations and tumours, and which I have discussed at length elsewhere.¹

As this form of tumour is yet imperfectly understood, as very little is still known concerning its histological nature, and in view of the fact that the determination of its essential character will have an important bearing on its treatment, I will again venture a word concerning it. These are the members of the second group, and are closely allied macroscopically to simple laryngeal papillomata, for which they are easily mistaken. They are the growths which every student learns to recognise in the alphabet of his special studies. They are often the *avant courier* of laryngeal and pulmonary tuberculosis, and may remain for a long time as the solitary outward and visible sign of that disease. Their presence in the interarytenoid fold often furnishes strong presumptive evidence of incipient tuberculosis. They vary greatly in size, shape and situation, sometimes projecting from under the anterior commissure of the larynx in the form and appearance of a spray of coral, at others filling the larynx with growths macroscopically indistinguishable from simple papillomata, which are sometimes so abundant as to cause stenosis and necessitate tracheotomy. Their most characteristic seat is the posterior laryngeal wall, where they appear as warty acuminate or leaf-like outgrowths of a pale greyish or pronounced reddish hue: or banked at that situation in a solid mound, either smooth in contour or bristling with multiple acuminate projections. The histology of this class of tumour has been imperfectly studied, and may well in the future bear a more careful scrutiny. Stoerck, who first called attention to their presence in the interarytenoid fold as an infallible sign of incipient tuberculosis, following Rokitansky, regarded it as the result of an

¹ *Archives of Medicine*, New York, October 1, 1882, and an unpublished paper read in this College in December, 1904.

indurated proliferation of the connective tissue which occurs in the course of chronic tubercular disease of the mucous membrane in the neighbourhood of the arytenoid cartilages. Kundrat, who examined several of Stoerek's cases, pronounced them essentially papillomata and non-tubercular in origin. I know of no other special observation on the subject, with the exception of the microscopical appearances of a case of my own, examined for me by Sydney Cone, then pathologist to the surgical department of the Johns Hopkins Hospital, many years ago and reported to the oto-laryngological section of this College in December, 1904. I have not time to go into a detailed account of the anatomical report. Suffice it to say that in the sections examined the picture was that of a tuberculosis of a papilloma-papillomatous tissue infected with tubercular tissue. Whether or not the growth is originally tubercular or becomes so secondarily through infection is a point to be determined by further observation. Without going into explanatory detail, the study of the sections developed facts which were not only of histological but also of eminently practical importance. It was especially interesting from a diagnostic point of view in the microscopic differentiation of this form of outgrowth from the papillary variety of epithelioma, particularly when, as sometimes happens, the tubercle bacillus is only found after a diligent and prolonged search. It also went to show that incomplete attempts at removal only served to stimulate the local growth of the neoplasm and increase the danger of reinfection. It will be the task of the future to determine whether all growths of this nature found in a tubercular subject show a tubercular structure, or whether there are some that adhere to the strictly papillomatous type. Whether benign or tubercular, the very fact that this variety of tumour often heralds the approach or proclaims the presence of tuberculosis in the individual only emphasises the importance of examining with care not only clinically, but microscopically, all papillomata taken from the larynx and trachea. With regard to their mode of development, it is quite possible, as Cone has suggested, that in some cases at least they may have an origin analogous to the papillomata found in the urethra and vagina, which are probably produced by infection by the tuberculous discharge from the bladder and uterus.

This variety of outgrowth was always looked upon as perfectly legitimate surgical prey. I have often removed the entire tumour or portions of it, calmly and utterly innocently oblivious of the fact that I was in so doing stimulating its local growth and scat-

tering the disease elsewhere, thus shortening the journey of the patient to the grave. Looking back through that night of meddling, though innocent surgical transgression, as I view it in the long experience of after years, and fully mindful of the fact that the universal sentiment of authority counsels immediate surgical removal of all growths in the larynx of the tubercular subject, I must confess that even now I approach the consideration of their treatment with great trepidation as I give you the advice, which I gave in this College, but before another society, over twelve years ago. The mere presence of a tubercular tumour in the wind-pipe is not always necessarily an indication for its removal. If an operation is to be done, it should be done for good and sufficient reasons, and after weighing carefully all the facts in each individual case. Tubercular tumours of the larynx, as far as we at present know, pursue a slow course, show little tendency to early ulceration, and may survive with unbroken surface the process in the lung. In their removal by ordinary methods the possible dangers of autoinfection, with metastasis and reinfection at the seat of operation, should not be lost sight of. That these dangers are not chimerical is apparent from some of the recorded literature of the subject, and notably in the case of Hennig, in which death from reinfection took place thirty-seven days after the operation. In my own cases, two were found *post-mortem*, two were already past all surgery, while the fifth remained with unbroken surface for ten years, and was not touched with instruments of any kind. Serious interference with function should, of course, constitute ground for operation, and the character of the latter will depend on the nature of the case. Whatever method of procedure is adopted, it must be radical and include not only the removal of the growth in its entirety, but also a liberal portion of the surrounding healthy tissue. A closer study of tubercular tumours of the larynx will be necessary before we can formulate a definite plan of surgical treatment. In the meantime, we must watch and wait.

Out of all the joyous hours at Golden Square that still linger affectionately in my heart and in my recollection, there comes to me but one disturbing and discordant memory—our treatment of cancer of the larynx. This consisted, I shudder in the telling, in the performance of tracheotomy, and the subsequent removal, piecemeal, of the growth through the natural passages. By this process, which to-day in enlightened surgical communities would be considered as a means of slow murder, the growth was stimu-

lated at once into much greater activity; the patient naturally became worse and worse, and was sent to his long home much earlier than if he had been left severely alone. Of course, there was never a thought of cure. The patient was passed around from surgeon to assistant, and from assistant to student, each in his turn removing fragments from the larynx. One of the visitors to the clinic said, on one occasion, of a case thus maltreated, "Look at the poor devil; he has been plucked at by every expert and tyro in the place!" Naturally, the more the forceps were used, the more desperate became the plight of the patient. These were in very truth the days of "frightfulness" in the management of this disease. As I have often said since then, when I look back through the years in which I have seen cancer of the larynx maltreated, and in which I have unconsciously maltreated it myself, I am simply appalled at the retrospection. With the accusing voice of those days of sacrifice and slaughter still ringing through my mind, and in full view of the chastening experience of succeeding years, I trust that in the long and bitter fight that has raged around the treatment of cancer of the upper air-tract during the last two decades I have at least in part atoned for the sin of my youthful experience, although I have been held up as a still greater transgressor for demanding in all cases of larynx cancer the most radical measures, and for keeping hands off the growth until the last. Just here permit me to correct a wrong impression that seems to have been created in the minds of some of my colleagues both at home and abroad as to my views on microscopic evidence in the diagnosis of suspicious looking neoplasms of the larynx. According to my critics, I reject completely the use of the microscope in the diagnosis of malignant growths of the larynx, and therefore would recommend the complete operation for that disease in the presence of doubt as to its nature. As one of them puts it, I "kick the microscope into the dust heap." No one but a congenital fool would refuse in doubtful cases the aid of the microscope, and no one outside of an asylum would advise a radical operation (such as the one suggested by me) without a certainty of diagnosis. There are some things that go without saying and which ought to be obvious to the dullest apprehension, and I cannot think that anyone who knows me can believe me guilty of such insanity. My original remarks, made in 1900, which have called forth such a storm of abuse and misrepresentation, dealt in general principles of diagnosis, and no attempt at elaboration or specification was made. My position, as then stated,

is simply that the microscope should be the court of last resort—the final method of appeal. Hands off the growth until the last. Then, if microscopic examination is necessary, let patient and surgeon be prepared for immediate operation. As I said on the occasion already referred to, “before resorting to thyrotomy as a diagnostic means in general, especially if a portion of the growth is to be removed for examination, it should be clearly understood beforehand with the patient that, if the disease should prove to be cancerous, the surgeon shall be at liberty, if in his judgment it seems best, to proceed at once to operation.” I took this stand in order to check, if possible, the reckless and indiscriminate removal by laryngologists of suspected tumours of the larynx for microscopic examination, and from what I hear and read I may be pardoned if I say that the warning has not been given in vain.

As these remarks are devoted to reminiscence and confession, and not to controversy, a discussion now of the subject would be entirely out of place. As I leave it, let me turn to the last words on larynx cancer by Butlin, the inspiration and leader of the English school, uttered not long before he died.

“I wish I had begun to perform it (laryngectomy) earlier. I am sure that several of the cases in which I performed thyrotomy were much better fitted for laryngectomy, and I cannot help thinking I might have saved one or two of the patients in whom recurrence took place if I had then removed the larynx. I think the glands ought to be removed in every case in which there is extensive carcinoma of the larynx, even if it be intrinsic, unless the disease is limited to the middle zone of the interior of the larynx. Even in these cases it would probably be a wise precaution to remove the glands. I have never removed the glands and the larynx at one sitting.”

Catarrhal affections of the larynx were treated with inhalation, insufflation, and topical applications were made to that organ with the camel-hair brush, the use of compressed air being then unknown in England. Our main reliance was on the salts of zinc, the chloride and the sulphate in simple, and the sulphate of copper in syphilitic laryngitis, and I may say in passing that there are few, if any, agents that surpass in efficacy in simple inflammation of the larynx these preparations of zinc, which are among our oldest and most trustworthy servants in the treatment of this class of affection. Among the ward formulæ in Bellevue Hospital was one which we greatly relied upon in the treatment of venereal warts, and which consisted of a solution of sulphate of zinc in spirits of lavender. When this was applied to the growths they vanished as if by magic. So striking was the astringent effect that when I started in practice I had a more elegant preparation

of the zinc salt made, which I have been using successfully ever since.

Comparatively little was known at that time of affections of the thyroid gland. All cases were alike to us—all were goitre. The treatment consisted either in drawing a seton through the tumour or embedding in its substance a dart of zinc shaped like the point of an Indian arrow and inserted into the body of the growth through a liberal opening with the knife. Profuse suppuration was thus set up, which after a lapse of more or less time, and after much inconvenience and suffering, caused, or did not cause, diminution in size or virtual disappearance of the growth. A photographic album was kept in the clinic with life-like pictures, which preserved the images of the patients in the various stages of their martyrdom.

Turning now to diseases of the nose (rhinology), we find that, with the exception of polypus and ozæna, it was practically a closed book. Even with deflection of the septum (can you think it?) we had no concern. The same was true of the accessory sinuses. In the second volume of Morell Mackenzie's classical work, published as late as 1884, in the section on nasal diseases, the subject is not even mentioned. Even the antrum was overlooked, in spite of the fact that centuries before, Drake and Cowper, and the two Meibomii (father and son), had lent their influence to the necessity of the investigation of antral diseases, and to the surgical methods for their relief. And Palfyn, in the seventeenth century, had called attention to frontal sinus suppuration, and proposed the trephine for its cure. All that I knew about the sinuses was contained in an article by Sir William Hamilton in the *Medical Times*, 1845, and familiar to me in my college days through its reproduction in an appendix to his well-known work on Metaphysics. In this curious contribution he sought to combat the dogmas of phrenology by showing, among other things, that the frontal sinuses were the natural abodes or hiding places of many different kinds of worms and other low forms of life.

"The motley multitude of its guests might almost tempt us to regard it as

‘The cistern for all creeping things
To knot and gender in.’”

Much confusion existed in those days of the sixteenth and seventeenth centuries as to the source of purulent discharges from the nose, some considering them all of cerebral origin, others

declaring that those which were not attended with fever, headache, or pain elsewhere, and from which the pus flowed from the nostrils without inconvenience to health, as in a suppurating ear, came from what was known then as the pituitary sinuses. Nathaniel Highmore, who wrote at that time, and whose name has been preserved from oblivion by his graphic account of the antrum maxillare, did not help the existing confusion much when he declared that the ostium maxillare, which he described and depicted, was an immisary, and not an emissary, foramen of that cavity. Hence those who followed him described pain in the teeth and caries as due to a "humour distilling from the head into the antrum of Highmore," thus getting the cart well in front of the horse. Let me remind you here that in the ancient Greek systems of medicine all nasal discharges, whether catarrhal or suppurative, were supposed to come from the brain, through the cribriform plate, ethmoidal and sphenoidal cells, according to Hippocrates; from the pituitary gland and ventricles, according to Galen. These views of the Greek physicians, whose notions of the aetiology of disease were curiously influenced by the prevailing philosophical doctrines and vagaries of their time, were followed by the Arabian school, and were imported by them into Europe, and prevailed on the Continent as late as the seventeenth century, when they were completely overthrown by the colossal labours of Conrad Victor Schneider, whose wonderful anatomical picture of the nasal mucosa led Haller to christen it the Schneiderian membrane. It is true that Van Helmont had long before assailed with pitiless satire the "grey-haired dreams of the Grecians"; that Cardan had previously shown that the discharge came sometimes from the secreting portions of the nasal membrane, and that Botal had entered an anatomical protest against the hypotheses of the ancients, but it is chiefly due to the exhaustive anatomical researches of Schneider that their absurdity was demonstrated. Schneider's demonstrations imparted a great impetus to the study of the anatomy and surgery of the head. Morgagni laughed at Highmore's blunder, but conspicuous among the surgeon anatomists of his day it was William Cowper who was the pioneer, and who shed most light on its differential diagnosis and treatment, and made sinus suppuration give up the secret which it had kept so long.

But in spite of the fact that the subject had a literature running back to remote or even ancient times, it was not until the great grippe epidemic in the declining days of the century that has recently passed away that man first awoke to the full realisation of

what a curse his sinuses had been to him (and he, too, all unconsciously of the fact) throughout all the centuries that had gone before. At that time, while we had made great advances in technique, while the dawn of a new era in this class of affection was breaking, it must nevertheless be confessed that we followed very closely the teachings of our masters of long ago.

In 1894, at the Congress of American Physicians and Surgeons, the subject of accessory sinus disease was given prominent place, for the first time in this or other countries, before a general medical and surgical audience of the entire society. Bosworth, Bryan, and I were assigned to the task of opening the debate. The following year the first international discussion of the subject of the surgery of the sinuses was held in London at a special and unusual session of the British Laryngological, Rhinological and Otological Association. Those who took part in it and gave their views and experiences were Bosworth, Luc, Delavan, Moure, Lennox Browne, Daly, Mayo Collier, De Roaldes, Dundas Grant, Kranse, Bryan, Bark, Sajous, McIntyre, and Stoker. For some inscrutable reason I was asked to open the debate. The remarks of those who followed me were most instructive, and for that day a fairly thorough exposition of the then status of the question. I mention these two occasions, for they were among the early signals for the onrush of the coming events in this special department of surgery, which had already cast their shadows before. The ball had started to roll, the pot had commenced to boil; the worst was yet to come.

No, I shall not disturb the tonsil question. God forbid! I am down in cold, remorseless type in many places on that subject, and even if I wished to run away from my convictions, I would have no avenue of escape. I only want to say that those far-off days at Golden Square were, perhaps, the tonsils' happiest and most halcyon time; for it had not then been found out that the germs of a multitude of diseases common to man left well-established, convenient and natural avenues of entrance into the body to seek their destination by other and more devious paths through the tonsil substance; nor had this invading host of pathogenic visitors, some well known, others nameless and nondescript, yet found in the tonsil crypts and in the tonsil vessels either a birth-place or an asylum. They fell; yes, fell as leaves in Vallombrosa. Not a day passed that did not take its bloody toll of tonsils. The guillotine was nearly every day much the busiest instrument on the job. In all that long roll of cases I fail to recall a single serious accident after tonsillotomy, except now and then severe hæmor-

rhage; nor have I even seen since then the operation done with more dexterity and thoroughness. If the surgeons of those days did not do as much far-reaching good as the tonsillectomist of the present time, they certainly did infinitely less harm.

One of the strangest things in the early development of rhinology in England and America was the slow and belated perception of the importance and significance of the condition falsely known as adenoids. Although over ten years had elapsed since the publication of Meyer's work on the subject, and although two years later it had been translated into English in the *Transactions of the Medical and Chirurgical Society of London* (1870) very little attention was given to it in the clinic. Woakes and I operated on a great many cases. Woakes wrote a paper in which he maintained the capillary nature of the growths against the generally accepted belief that they were glandular or adenoid in structure. We never knew our mistake until French had to tell us that they were neither papillomatous nor adenoid, but lymphoid in character. Woakes was an interesting personality, with original, but often erroneous, theories. His work on "Necrosing Ethmoiditis," while pathologically hopelessly wrong, served to first rivet attention on the study of ethmoiditis, and was therefore historically the beginning of the modern literature of that affection.

In looking back to the old days in London, allow me to recall yet another experience, which to me at least has a certain historical interest. One morning I received a visit from a friend and fellow-lodger in the house in which I had, as the English say, "chambers." He was a phlegmatic Dutchman, a born linguist (spoke seven or eight foreign languages fluently), a globe-trotter, an observer of a most inquiring and eager mind. He had come to consult me about a coryza which invariably and only occurred after sexual indulgence. I told him that he must be dreaming, or that he must catch cold during the sudden cooling off process, following the heat of tempestuous bodily exertion. Not at all. He did not get unduly excited at the time. On the contrary, he was more or less indifferent to coitus, but practised it one day a month as a physiological duty (or purge), as a matter, as it were, of personal hygiene. It was part of his philosophy. One night during the month coitus, the following morning always coryza.

The situation was unique, interesting, absolutely new to me and others to whom I told the tale. Shortly after this experience I stumbled quite by accident in the clinic on two women who com-

plained of stoppage of the nose, sneezing, and watery discharge, occurring only during the menstrual period. Not to delay you with a longer recitation of the circumstances in the case, without a guide, in an absolutely unknown territory, coming across an observation here and there and ever on the alert and looking for cases bearing on the subject myself, at the end of five years I had accumulated enough material from which to generalise and publish my conclusions, which I did in the *American Journal of the Medical Sciences* for April, 1884, in an essay which was the first attempt to reduce this curious relationship to a scientific basis. This, then, is the simple story of the almost accidental discovery of a then unknown physiological relationship which to-day has an enormous literature. Two years ago I received from Germany a work by the younger Seifert, which consisted of a critical review of nearly 300 brochures, theses and papers on the subject, and even this list of contributions was incomplete.

From London I went to Munich, where I became an assistant in the clinics of Zeimssen and Oertel. Zeimssen was a prolific writer, but is chiefly known to laryngologists as the author of the articles on diseases of the larynx in his well-known "Encyclopædia of Medicine." Oertel wrote little or nothing on laryngology, but his articles on the physics of laryngoscopy were the most scientific of his day. Zeimssen, a tall, distinguished, patrician type of man of advanced years; Oertel, a little hunchback dwarf of middle age, but whose face was intelligence itself, and whose eye was as piercing as the Roentgen ray. Both masters of internal medicine, both experts in laryngology.

Although a comparatively small town, the wealth of clinical material in Munich was enormous. I have never seen in a given period of time, not even in the vast clinics of London, such a number of laryngeal growths, nor have I ever seen them removed with greater skill. They came to Oertel from all parts of the Continent, and the little man, even in the most difficult cases, always made good. For the student the atmosphere was ideal, the combination of special and general work perfect. At one moment we were giving cold baths or packs to typhoid patients, in the next removing a laryngeal growth. The special branch of medicine was not studied apart, but kept in contact and closest touch with all the other departments of medicine. We could not get away from any one part of general medicine even if we wished to do so, and this leads me to say that the proper time to lay the foundation for the educated specialist is in early life,

in his early studies, if possible in his undergraduate days, for it is at this period of his medical training that he is in the best position to acquire that fundamental knowledge, and, what is of more importance, that breadth of mind which is so essential to his future development. At this receptive period of the development of his mind he can best recognise the limitations of each special branch of medicine, and can best be taught to generalise profoundly not in one, but in all departments of medical thought. It is at this stage of his career that it is impossible for him to cut loose from the other departments of medicine. The growth of his special studies goes on *pari passu* with his advance in other lines of work, and he is brought in daily contact with disease in other organs of the body. He learns at the outset that no department of medicine is isolated and independent, but that they are all mutually dependent and co-ordinate. And if he is made of the proper stuff, this fundamental lesson and illuminating first impression will follow him in his special work in after life as an inspiration and a guiding star.

Those days of Munich were halcyon days. I thank my stars that I lived and learned in the older Germany, before that nation had altogether ceased to be the dreamer that she was when she entered the modern world; that I heard her music and listened to her songs in the joyous, peaceful days of the Lorelei, and not in those of the Hymn of Hate; before the departure from simplicity and simple idealism of the lovable people who gave the world Santa Claus.

Later, when I studied in Vienna, I found a different atmosphere. Here the only means of acquiring special knowledge of the subject were the imperfect courses on diseases of the larynx given by the professors and their assistants. There was no special course in rhinology, which subject, as in England, was left entirely alone. Stoerck and Schroetter were the leaders in laryngology at that time. The former, although handicapped somewhat by his method of examination, the so-called Schusterkugel, and a trembling hand in manipulation within the larynx, always delivered the goods. Hans Chiari, then assistant in pathology, now professor in Strassburg, had charge of the department of pathology in the Rudolfspital. He had five young men to help him in the laboratory, three of whom were Americans—Councilman, now of Harvard; Belfield, of Chicago; and myself.

It was one of my duties at the autopsies to look after the condition of the larynx and trachea, so that when one morning the body of a man who had died of

cancer of the stomach was brought in for a *post-mortem*, I was handed the windpipe for examination. Secondary cancerous deposits were present in the liver, kidney, spleen, and other organs. The lungs, however, contained tubercular cavities; the pharynx, larynx, and trachea were free from inflammation and ulceration. The bronchial and retrotracheal glands were enlarged, tumefied, and caseous. In the membranous posterior wall, at its junction with the cartilaginous framework of the trachea, about $1\frac{1}{2}$ c.c. above the bifurcation, was a well-defined circumscribed tumour about the size of a small bean, its long axis parallel with that of the trachea, and of a uniformly even, smooth appearance. It was covered by the mucous membrane of the trachea, and was dense in consistence, giving to the touch the sensation of a hard cancerous nodule, for which, indeed, it was mistaken. A similar growth was found in the pericardium. The microscope revealed a picture for which I was not prepared. It showed, namely, that the tumour, which seemed to have its origin in the submucous connective tissue, consisted in the main of an aggregation of distinct tubercular nodules, set in a more or less well-marked vascular network of connective tissue. The majority of the tubercles lay in the deeper portions of the mucous membrane and in the submucous tissue. A few were more superficial, lying under the epithelium. They exhibited all grades of degenerative change; in some caseation was so far advanced that nothing remained but the cellular wall. Between the individual nodules the connective tissue was hypertrophied, and the seat of a moderate amount of round-celled infiltration, which had invaded the glandular follicles in its vicinity. The tissue of the trachea in the immediate neighbourhood of the growth presented no remarkable change. The nodule in the pericardium showed the same histological structure that was found in the tracheal neoplasm. Shortly after this experience I came across a similar case, in which the tumour was confined in a most unusual way to the vestibule of the larynx. The subject from whom the growth was taken died of pulmonary tuberculosis. The whole upper compartment of the larynx, including the epiglottis, aryepiglottic folds and ventricular bands, presented a remarkable appearance. It was completely covered by little mounds, which represented small, uniformly smooth, dense, moderately hard nodular growths, which lay beneath the mucous membrane. The nodules were about the size of a split pea, each merging into its neighbours, so as to form one continuous growth. The process ceased abruptly on either side at the free border of the ventricular band. There was no trace of ulceration in pharynx, larynx, or trachea. Microscopic examination of numerous sections of the growth showed it to be of the same nature as the above-described neoplasm in the trachea.

These two cases were absolutely unique. Chiari had never seen anything like it before; no one had even suspected the existence of such a condition. After over a year's search through literature for similar cases, I published my own in the *Archives of Medicine*, New York, for October 1, 1882. As much confusion still exists as to what constitutes a true tubercular tumour of the windpipe, I may be pardoned for again drawing attention to the subject. Since the publication of my own, cases have here and there found their way into medical literature, some without doubt examples of true tubercular tumour as defined in my original article, whilst others—and these are probably in the majority—

are extremely doubtful in nature, and must be thrown into the category of localised infiltration or into the papillomatous group, which I have already considered. A true tubercular tumour is extremely rare, and by true tubercular tumour I mean not simply any localised swelling containing the bacillus, but a distinct, definite, characteristic tumour formation covered by broken epithelium and consisting of a congeries of miliary tubercles set in a vascular network of connective tissue and exhibiting all grades of tubercular degeneration to cavity formation. I have seen but three cases in which the diagnosis was microscopically established beyond a doubt, and two in which no histological examination was made. As far as my limited experience goes, the tendency of this form of tumour, as well as the papillomatous variety, is not toward ulceration unless tampered with by incautious attempts at instrumental removal. In one case, in which the patient made a gallant fight for life of nearly ten years and finally succumbed to pulmonary hæmorrhage, the growth—which consisted of a small, smooth, lobular tumour in the interarytenoid fold—during that whole period, beyond a slight increase in size, remained practically unchanged. These two cases are of historical interest, inasmuch as they are the first cases on record of tumours of any kind in the windpipe shown microscopically to be tubercular. They, therefore, represent the earliest exact knowledge of this form of tuberculosis, and are the first to establish the separate existence of this previously unknown phase of that disease.

As in London, so in Munich and Vienna, no attention was paid to the nasal passages or accessory sinuses, and therefore no courses on the subject were given. I had to turn my steps homeward to learn something about the diseases of these organs. Here, too, I entered a practically untrodden field. The subject holding the centre of the stage and overshadowing every other at that time was the surgery of the turbinated bodies, and especially the inferior, in the treatment of the hypertrophic form of rhinitis, and the operation engaging most attention was the removal with the cold wire snare of the posterior hypertrophied end of the inferior body for the relief of that condition. Although these masses were probably removed again and again with the wire, as anyone can convince himself by referring to the standard surgical works of the last two centuries, their true anatomical significance and relation to nasal inflammation was not properly appreciated until Bigelow demonstrated the erectility of the tissues concerned in their development. As I have pointed out

elsewhere,¹ Bigelow was not the first to show the erectility of that structure, but to him, apart from independent discovery, belongs the credit not only of giving the best description of this tissue, and of more accurately defining its minute structure and extent of distribution, but also of showing that the so-called mucoperiosteum of the posterior part of the septum is in reality an erectile substance. Bigelow was also the first to observe the alternate inflation and collapse of these bodies, which he compared to that of the lungs of a small animal, thereby leading the way to the rational interpretation of nasal inflammation. From their resemblance to the cavernous bodies of the penis Bigelow gave them the name of turbinated corpora cavernosa, but as Henle and, more recently, Zuckerkandl, have pointed out, they may be with more propriety classed among the contractile as contradistinguished from the erectile tissues.

The credit of urging the necessity of their removal by the cold wire snare belongs to Jarvis. Prior to that the galvano cautery had been used in this country and Germany. In the latter country it was extensively adopted, and it is a noteworthy fact that Zaufal, who is an enthusiastic advocate of the cold wire snare in the removal of polypi, recommends the cautery for turbinated hypertrophies. Jarvis was followed by Bosworth, who wrote enthusiastically upon the subject. I wrote about it, everybody wrote about it, and everybody operated. One of my colleagues said that, on leaving my office one day, he trod on what he thought was a lot of peanut shells, but on picking some of them up he found that they were turbinated bones. The operation in the course of time was abandoned. The operators went to the other extreme, as in the case of all surgical crazes. The operation, however, within proper limits, did much good, for the following reasons: In cases suitable for it, it fulfilled in a simple and radical manner the removal of the obstruction, and it did this without interfering with the normal air currents in their curvilinear course through the middle meatus, as that avenue and the anterior portions of the passages remained unchanged in their anatomical relation, thus preserving intact normal respiration and natural filtration of the air. As the hypertrophied mass meant tissue largely deprived of function from the loss of glands and blood-vessels, their absence involved no sacrifice of physiological usefulness, while their removal not only facilitated cleansing of the posterior nares, but also diminished apparently the amount of tenacious mucus which they contributed

¹ *Boston Medical and Surgical Journal*, January 1, 1855.

to the nasal discharge. It also seemed to relieve the collateral congestion in other parts of the cavernous structure. Finally, in some cases it caused the complications of so-called reflex character to disappear, especially cough and asthmatic breathing. The latter is easily understood when we reflect that it is this portion of the reflex sensitive area of the nose that is most responsive to reflex producing impressions, notably those concerned in the production of cough and asthma.¹

The simple removal of the posterior end, leaving the rest of the structure intact, is a safer and much more rational procedure than the wholesale destruction of the turbinated bodies, which is the routine practice so common at the present day of those who forget that the aim of nasal therapeutics is preservation of function, and not the destruction of everything in sight. Let me repeat in this connection what I have said upon another occasion :

No one questions the frequent necessity of the complete or incomplete sacrifice of the middle turbinate bone, notably in the case of accessory sinus suppuration and the radical cure of tumours

¹ The effects or sensations produced by irritation of the nasal mucosa, whether by mechanical, simple tactile or electric contact, chemical or thermic agencies, or by a pathological process, are more correctly appreciated and located in the anterior than in the posterior portions of the nasal passages. The more we recede into the deeper regions, the nearer we approach the pharynx, the more vague and indeterminate and inexact are the messages which stimuli carry to the central nervous apparatus. Thus, for example, in stimulation of the lower and posterior portions of the nasal cavity the sensation of irritation or hurt is, in many cases, referred not to the nose itself, but to the larynx, and in some instances to the bronchial tubes, producing in the one case cough and in the other bronchial wheezing. This is not only experimentally but clinically true. Now in calling attention many years ago to a special sensitiveness to certain reflex producing impressions in the nasal mucous membrane, I did not, nor do I now, as has been wrongly inferred, desire to maintain that pathological reflexes may not originate from other portions of the nose, for wherever there is a sensitive nerve filament it is possible to provoke a reflex movement.

My contention is simply this: that the area indicated in my original paper represents by far the most sensitive portion of the nasal cavities, and that pathological reflex phenomena are in the large majority of cases related to diseased conditions of some portion of this sensitive area. That all pathological nasal reflexes arise from irritation of this particular area is a preposterous proposition which I do not and never have maintained. Whether a special sensitiveness in certain portions of the nasal mucous membrane exists or not, the agitation of the question has led to more rational methods of procedure in the treatment of a large class of nasal affection and to more conservative methods in intranasal surgery. Before the location of the sensitive area or areas, the nasal tissues were destroyed with an almost ruthless recklessness that bade fair to bring intranasal surgery into the worst repute. (For an elaborate discussion of this whole subject, see article by the author in "Wood's Reference Handbook of the Medical Sciences," edited by Buck, Wm. Wood & Co., New York, 1887, vol. v, pp. 222-242.)

of the nasal and accessory cavities, and, in occasional cases, as a substitute for operation on the septum. But to make it responsible for a host of woes unnumbered, and to attack it surgically from a purely theoretical standpoint, is vicious both in principle and practice. Especially preposterous is its removal for the alleged cure of the disease falsely called hay fever. In dealing with this structure it should always be remembered that its anterior end is one of the chief buttresses against the admission of foreign matter to the air-passages, the principal point at which filtration of the external air takes placê. It should, therefore, not be assailed on indifferent and insufficient pretext, or sacrificed on the altar of fantastic hypothesis.

One of the most interesting, if at the same time one of the saddest, chapters in the books of rhinology is that which tells the story of the surgery of the septum. In the early days of my special practice comparatively little had been done to radically and satisfactorily remedy abnormalities of that structure; observers busied their brains with the burning question whether the deflected septum is turned more frequently to the right than to the left, never concerning their faculties with the remedial aspect of the subject, and in the presence of that overshadowing conundrum the treatment of the condition was lost, while many followed the ancient advice of Marcus Aurelius Severinus, who declared that, inasmuch as the distorted system was doubtless placed in that position by the will of God, it would be eminently sacrilegious to interfere with such conspicuous manifestation of Divine dispensation, and therefore it should be left severely alone.

The measures then in vogue were the Blandin artificial perforation, a mischievous and lazy performance; the Adams' operation, the forcible restoration of the septum to the middle line with forceps, a very unsatisfactory and clumsy undertaking; stellate fracture, commonly known as Steele's, and later as the Asch operation, and the saw. Let me stop right here to do a dead man historical justice. The principle involved in the stellate fracture originated with James Bolton of Richmond, Virginia, who many years before described his method of procedure in the *Virginia Medical Monthly*. Bolton first employed an ordinary pair of button-hole scissors, with which he made the stellate incisions. Subsequently an instrument was made for him by Tiemann of New York, and from this developed the apparatus used at the present day.

Later the introduction of the surgical drill, first driven by the

dental engine and afterwards by electric power, marked a decided advance in surgical procedure. With the arrival of other and newer methods this excellent agent fell into undeserved neglect, in spite of the fact that a variety of work, and delicate work, can be successfully done with it without interruption of the duties of the individual, and without disagreeable after-results.

But in spite of these improvements in the surgery of the septum there were cases which still baffled the most ingenious methods. This was particularly true in regard to irregularities in the conformation of its bony framework, as in certain cases of deep-seated deflection in which the patient would not submit to operation or the surgeon hesitated to perform it. To overcome this difficulty I proposed in 1882, at the annual meeting of the Virginia State Society, and carried out in the spring of the following year, 1883, an operation which consisted essentially in the removal of portions of the external wall, and notably the inferior turbinated bone of the obstructed side (or portions thereof) as a substitute, in suitable cases, for operation upon the septum itself.¹

The method is applicable in cases in which sufficient reason exists for not operating on the septum. Its principle may also be extended in its application to other surgical procedures within the nasal passages. Its chief value is in certain exceptional cases in which other methods are contra-indicated or can be carried out only with difficulty.

Since my original article was published, I have received several communications from various laryngologists in this country, notably from the late Jarvis, and Roe, of New York, in which they have stated that the principle had not only given them great satisfaction, but had also extricated them on more than one occasion from great difficulty and embarrassment.

The crying need in operation on the septum is greater simplicity of performance. With a comparatively speaking small armamentarium, backed by a *quantum sufficiens* of good, common, surgical horse sense, the surgery of the septum is not a complicated problem, but one which can be worked out with comparative simplicity and satisfaction.

Such was the state of the question thirty-three years ago. You know its subsequent history. I will not, therefore, carry you any farther into paths which are perfectly familiar to you, and will leave

¹ "On Removal of the Inferior Turbinated Body of the Obstructed Side as a Substitute for Operation on the Deflected Septum in Certain Cases," *New England Medical Monthly*, 1884, iv, p. 249.

you now with this brief review of the older methods, bidding you remember that it is a long, long way from button-hole scissors to the complicated technique of submucous resection, and asking you to graciously accept this little bit of personal experience and reminder of what we had to contend with in the earlier days from one who has travelled through the dust and heat of that road.

At a banquet held several years ago by the American Laryngological Association, the toastmaster, Kelly Simpson, in calling on Bosworth for a speech, said that his (Bosworth's) saw would be still on deck long after the swivel knife had been forgotten. While this may sound to some as the irresponsible language of post-prandial enthusiasm and exaggeration, at the same time it may well come to pass that in some cases we will return to some of the older methods, or modifications of older methods, which, though less spectacular than most of those performed at the present day, did very much less harm.

The elder Disraeli, in the preface to his "Amenities of Literature," says that to be ignorant of all antiquity is a mutilation of the human mind. It has long been my custom when seeking something new to go to the ancients. So in the rush of modern invention and procedure it may sometimes be wise and profitable to pause, retrace our steps, and pass in review the work of those who have gone before. We of this generation may in this way learn much from those who, in the grey dawn of its earlier history, fought the battles of laryngology to make its calling and election sure in the eyes of their fellow-men.

In this rambling, disorderly, crazy quilt talk which I have given this little family gathering here assembled, I have endeavoured in an informal way to recall some of that past, to remind you that all things did not go very well then; that difficulty after difficulty had to be met and surmounted; that the distrust in which our calling was held in many quarters had to be overcome, and that finally the laryngoscope had to be brought from its lowly place as a simple means of examination to occupy its now recognised lofty position as an instrument of progress and power in medical research, in scientific expansion and in the exploration of the unknown. The men of those days lived in a time of crisis. Laryngology was on trial, its fate was hanging in the balance. An obsession or madness such as some that have since swept through the specialty would have turned the scales, for the serpent of Esculapins had not then been driven from the temple by the Golden Calf. Remember, too, that in that day the earnest seeker after truth

had to reckon not only with his brother in regular standing, but also with the charlatan and the professional quack. It was this latter gentry's quickening opportunity and appointed time; for in the darkness and mystery of an incompletely explored terrain they found their Canaan, and in that promised land their fields of gold. Medical men confounded them with the struggling laryngologist, whom they looked upon with suspicion, and spoke contemptuously of his limited sphere of work, quite forgetful of the fact that their own ignorance of the subject was abysmal, that their sole weapon for the conquest of throat disease was the probang, and that they were long unwilling to let even that frail sceptre of their power, or impotence, pass to other hands.

I have tried this evening to live only in the past; to forget the present with all its wealth of marvellous achievement; to call back a part of the practice of a rugged era, some of which deserves to outsleep Endymion in oblivion, but much of which was most wholesome and good; to breath again the purer and the happier atmosphere of that era, and to snatch from it, perhaps, some lost ideal; to roam once more through pleasant fields, wild and uncultivated maybe, but which loving recollection has for ever kept full of fragrance, even though the budding hope of laryngology had not then come to flower.

ADDENDUM.

The equipment of the medical student is not complete without some knowledge of the past history of his art and the names, the personalities, the aspirations, the ideals, the lives and deeds of those who made it. It is an amputation of his mind to cut it off from the wondrous story of the birth and growth and development of medicine and its compelling progress in all the ages, through storm and sunshine, through error and enlightenment, through failure and achievement. And if he goes at it in the proper way its study will not be labour, but will bring to him the most satisfying mental relaxation and the most refreshing consciousness of culture that cannot be obtained in any other way. In the short sketches which follow I have given a few brief references to the work of some of the men whom every student of rhinology should know something about.

Jean Fernel, or Fernelius, as he is known to the medical historian, was born in Picardie (1496), but later moved to Paris, where he acquired a large practice and became body physician to Henry II, then King of France, whose sterile wife, the notorious Catherine de Medici, was made to bear offspring through his skilful treatment, a service which so pleased the monarch that whenever he left home he always took Fernelius with him. On one of these excursions the physician's wife was taken suddenly ill with a cold and died, and her husband's grief was such that he followed her soon afterwards to the grave. Catherine had a number of children, among them two daughters—Elizabeth, who married Philip II of Spain, and Margaret of Valois, who married the King of Navarre—and a son, Henry,

who ascended the throne as King Henry III. It is interesting in this connection to recall the anecdote of the latter at the betrothal feast of his sister, Margaret, as an historical example of the power of olfactory impression in awakening sexual desire. On that occasion he dried his face, by accident, with a garment, moist with her perspiration, belonging to Maria of Cleves. This so excited him sexually that, although Maria was then the bride of the Prince of Condé, he could not restrain his passion, and made her miserable, as history tells us. A similar story is told of Henry IV and the beautiful Gabriel, who later became his mistress, the King's desire being aroused when at a ball he wiped his wet brow with her handkerchief.

Fernilius was a prolific writer, but among his services to medicine he should be remembered by laryngologists in general and students of sinus disease in particular as the keen observer, who a century and more before Schneider wrote, with the ancient doctrines of the Greeks and Arabians still unchallenged, and 400 years before our own time, drew, unconsciously perhaps, a subtle distinction between suppuration from the "pituitary" sinuses or thereabouts and the purulent flux which was supposed to come from the cavity of the cranium.

Gabriel Fallopius, 1523-1562, famous anatomist, whose name survives in many parts of the body, notably the Fallopian tubes, the brilliant pupil and successor of Vesalius, should be familiar to laryngologists for having introduced the cannula in the development of the modern snare and as the alleged discover of the sphenoidal sinus.

Aranzi, Arantio, or Julius Caesar Arantius, a celebrated Italian physician and surgeon of the sixteenth century, wrote among other volumes a work on the human fœtus and tumours, and invented a forceps for the removal of nasal polypi. He introduced an original method for the direct examination of the nasal passages. In a wooden window shutter, opening into a darkened room, he cut a circular foramen, through which the direct concentrated rays of the sun were allowed to stream. The organ to be examined (nose, ear) was thus illumined by the column of sunlight. If the sun was not shining, or if the examination took place after dark, he used a candle, or, better still, a globe of crystal filled with water through which the light was made to pass, thus anticipating the so-called "Schusterkugel" method of examination of the present day by nearly 300 years.

Nathaniel Highmore, an English anatomist, born in 1613, the author of books on the art of generation, hysteria, and hypochondriasis, is chiefly known to medical scholars by his work on anatomy, published in 1651, and entitled "*Corporis Humani Disquisitio Anatomica*," in which occurs his famous description of the antrum maxillare illustrated by a large plate with three or four figures, in which he portrays the cavity and its relation to the surrounding structures and to the brain.

The two Meibomii—John Henry and Henry, his son, the latter born in 1638 and known to anatomy as the discoverer of Meibomian follicles in the eyelids—were among the early investigators of antrum disease, as we learn from the work of J. G. Günz ("*Programma Indicis et Observationem Ad Ozænam Maxillarem Ac Dentium Ulcus Pertinentem Proponit—Lipsiæ*," 1753), a learned exposition of the maxillary antrum surgery of his day.

James Drake (1667-1707), an English anatomist and surgeon, chiefly remembered by his classical work on anatomy, entitled "*Anthropologia Anatomica*," was one of the first, if not the first, to call attention to the fact that the sanies of ozæna (fœtid and purulent discharges from the nose) came not infrequently from the pituitary (accessory) sinuses, and more especially from the antrum.

William Cowper, an English surgeon anatomist, born in 1666, has the credit of

having discovered the urethral glands (1702), which to-day bear his name, although they were previously found and described by Méry (1684), wrote several well-known works on the muscular system and a treatise on anatomy, entitled "The Anatomy of Humane Bodies," published in 1698, which he illustrated with 105 original plates, to which he added nine perfunctory ones of his own, which with a serene audacity which is not a stranger to some of our fellow-mortals of the present day, he boldly stole from the classical work of Bidloo (1685), a celebrated Dutch anatomist and contemporary. Cowper's service to laryngology consisted in bringing the main anatomical facts of sinus (antral) disease to light, in laying open, as it were, its pathological condition, in showing how it could be distinguished from other affections, how easy it was with the aid of anatomy to apply remedies direct to the cavities themselves, and finally how readily the structures could be reached surgically, thus making a giant stride from the practice which, we learn from Celsus, came down from a remote antiquity, of cutting open the face, even in cases of superficially situated ozæna and purulent discharge, and sewing it up again.

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE—LARYNGOLOGICAL SECTION.

May 5, 1916.

President: DR. W. BOND, in the Chair.

"The Complications following upon Intranasal Operations, and the Influence of Nasal Sinus Infection upon the Moral and Legal Responsibility of the Patient."

CASES AND SPECIMENS.

Group I.—Influence of Sinus Infection upon Moral and Legal Responsibility.

Pansinusitis with Complications—Neurasthenia, Appendicitis, Suicidal Impulses, Delusional Insanity; Operation; Complete Recovery.—W. M——, aged twenty-nine. This case is chosen as representative of several of the more important complications directly due to infection derived from sinus disease.

He came under notice in 1911 when suffering from great depression and general neurasthenia, for which he was under treatment. He had marked loss of memory for recent events and inability to concentrate his mind. He was a bank clerk, but had been obliged to throw up work. From being a remarkably cheery man and fond of mixing in society, he had become morose and miserable.

Briefly, his history began with an attack of influenza ten years previously; two years later he had appendicitis, but was not operated on till 1907, after further attacks had occurred. He suffered from insomnia for a year after that, and was sent on a voyage to Madeira, returning apparently restored. In February, 1911, he had another influenzal attack, and afterwards suffered from bad headaches and

insomnia, becoming again thin, miserable, and depressed. He struggled with his work till he was sent on a voyage to Sweden in May, 1911, but returned with memory defective and inability to do any work. He also had much nasal discharge, but no marked headaches. He confessed that he had had suicidal impulses on his voyage, and before he was treated was the subject of delusions that he was devil-driven, and that it would be a sin to be operated on.

September, 1911: A double intranasal antral operation was performed, much pus being found in the antra. Bacterial culture showed *Staphylococcus pyogenes aureus* only. He subsequently suffered from more marked insomnia, and his delusions were more pronounced. The frontal sinuses were washed out with some difficulty, daily for a time. He then refused food and believed he was a dead man, and that it was wicked to allow himself to have any further operation, and two male attendants were required to feed him forcibly. He was quite insane, and as it was a choice between further operation and a lunatic asylum, his parents chose the former. But he steadfastly resisted any operation, because it was wicked to allow time and trouble to be wasted on a dead man.

On October 29 I performed my radical osteoplastic flap operation on both frontal sinuses, which were exceedingly large, extending to the outer orbital angles, and running far backwards, so that the orbital roof was removed to enable the whole of the polypoid mucosa to be cleared. It proved to be a very difficult and long operation. The wound healed well, although the delirious patient tore the bandages off and resisted lavage for many days, always being forcibly fed.

December 3: The wounds all healed, and there was very little discharge, but he was still full of delusions of having committed unpardonable sins, and even then often refused food for a dead man. From that time he gradually recovered, though his delusions did not disappear for some months. But he was able to return to work, and did so well that about one year later he was in charge of a branch bank and has continued to do well ever since, becoming as bright, cheery, and strong as ever. The deformity from the frontal sinus operation was scarcely noticeable, even on close inspection.

The connection between the insanity and sinus disease was too close to have been other than interdependent, and I am strongly of opinion that his appendicitis was due to infection derived from the sinus in his first influenzal attack.

Frontal Sinus and Antral Suppuration; Thieving.—Mrs. X—, aged forty-eight, came to me in 1906, complaining of severe pain in left supra-orbital region, round the left eye, and in left parietal region. She had a severe influenzal attack a year previously, and, on recovering, the severe pains began in the frontal region, continuing to recur ever since.

When I saw her she presented the usual typical signs of left frontal and antral suppuration, but it was remarkable that the pain in the head and eye would come on abruptly like neuralgia at 10 a.m. and lasted till 1 p.m. daily with almost clock-like regularity. She also had left sphenoidal sinus suppuration.

November 5, 1907: The left antrum and sphenoidal sinus freely opened per-nasally, and the frontal sinus washed out. The frontal sinus was frequently washed out, also the other opened sinuses. She improved greatly, but still suffered from neuralgia and depression.

Shortly after this, her husband was greatly distressed because a valuable diamond ring had been lost by a friend in another county, and the police had discovered that the ring had been taken by his wife to a jeweller in Bristol to have the stones altered. There was no doubt that she had taken the ring; the evidence was conclusive, but the friends refused to prosecute. Now the patient—a lady in good social position—did not know that I had heard about it, but some weeks later in the course of a visit she herself told me of what she had done as a matter of interest, showing how absent-minded she was, saying she had gone to the room at her friend's house and picked it up with her own after washing; that she thought it was one left her by an aunt, and not liking the stones took it be altered.

September, 1908: The frontal sinus suppuration and left supra-orbital neuralgia having recurred and persisted, I performed my osteoplastic flap radical frontal sinus operation on the left side. She made a good recovery, and was so pleased with the absence of deformity that she had a photograph done for her friends and myself. The cure has remained permanent.

Pansinusitis; Thieving.—Y——, aged seventeen. This patient was quite recently arrested for having stolen a postal order while engaged as a letter-sorter. When interviewed, she admitted the theft, but she had displayed egregious stupidity in carrying out her depredations. She had previously borne a good character, which was testified to by a medical man in whose employ she had been for some years: "She has frequently received money and receipted accounts for me at my surgery, and I have always found her reliable and trustworthy." She came of very respectable parentage.

The medical history of the case was briefly as follows: She came under my notice as an out-patient at the Royal Infirmary in 1911, and underwent an operation for antral suppuration in June of that year. In July, 1913, she had a further operation on the ethmoidal labyrinth, and in October both frontal sinuses were opened per-nasally owing to persistent discharge. After that she continued to complain of supra-orbital pain and a considerable amount of discharge. She was under observation from time to time, and in November, 1914, a septal resection was performed. She had discharge from the left ear after scarlatina, followed by diphtheria, and which persisted at intervals for seven years. She had a left radical mastoid operation in January, 1915. It will be seen that she was an inveterate case of pansinusitis with double otitis media. I had no opportunity personally of judging as to her moral character, but there was sufficient evidence that she had been exposed to such pernicious influence as might result from infective conditions of the sinuses.

I sent an epitome of her medical history and of the operations performed to her solicitor, and in view of the fact that she had previously borne a good character, and also that she had exhibited such lack of intelligence in the method of carrying out her thefts, the justices took the view that the disease had some influence in bringing about her downfall, and that she was not normal, and therefore bound her over under the Probation of Offenders Act.

Cases illustrating the Effects of Nasal Accessory Sinus Infection.—Nasal accessory sinus disease causes baneful effects on the nervous system which show themselves in headaches, mental depression,

slow cerebration, loss of memory, irritability of temper, moral perversion, and, in the reporter's experience, in this order of frequency. Almost every case of accessory sinus disease shows one or more of these phenomena. If there is nasal obstruction associated with the sinus disease, the effect on the nervous system is likely to be worse. The more accessory cavities there are involved, and the more chronic the disease, the more frequent and the more severe are the deleterious effects on the higher cerebral functions likely to be. These are the opinions arrived at from an examination of the reports of 200 cases of nasal accessory sinus disease taken at random from the reporter's practice. The cases comprise: Antral disease (single or double, with or without associated ethmoidal and sphenoidal disease), 143; frontal sinus disease (single or double), 7; frontal sinus and antral disease (single or double and with or without ethmoidal and sphenoidal disease), 21; ethmoidal and sphenoidal disease, 29. These cases can be divided, according to the presence, in a more or less marked degree, of the nervous phenomena already noted, into three classes—viz.: (1) Those in which these are absent or present to only a slight degree; (2) those in which they are bad; (3) those in which they are very bad indeed. Naturally, such a division is necessarily of an arbitrary nature, but as far as a standard could be set it was adhered to without prejudice. The result in tabulated form is as follows:

Cases	Class 1	Class 2	Class 3
143 antral	90	39	14
7 frontal	5	1	1
21 frontal and antral	9	8	4
29 ethmoidal and sphenoidal	22	6	1

The effect of operation is, in most cases, most satisfactory from the psychological point of view, but it is necessary to be guarded in prognosis in dealing with patients in whom signs of mental weakness or of a markedly neurotic tendency were present before the sinus disease developed. In these the sinus disease is likely to have a very bad psychical effect. Three cases of this kind are found in Class 3, two having suffered from antral and frontal disease and one from antral. The two former improved, the latter did not.

Sinus disease in young subjects retards mental development, but the cure of the disease leads to rapid improvement in this respect. The following case has special features:

S. P.—, male, aged twenty-two, complained of nasal obstruction and nasal discharge of long standing. He also complained of frontal headache, great depression, loss of self-control, and it was learned he was a moral degenerate and an alcoholic, and had become unfit to attend to a good business of which he was the owner. He was convinced that his nose was the cause of his mental and moral instability. He had a double septal deflection pressing on both middle turbinates, and so occluding both infundibular regions. The septum was treated by submucous resection. This was followed by some improvement, and he disappeared from observation, though it was learnt from time to time from his doctor that there was still much room for improvement in his mental condition and his moral conduct. Two years later he came under observation again. He still complained of frontal headache, and there was pain over the right frontal sinus. Evidence of right frontal sinus disease was found, and was probably of long duration. The sinus was

operated on by the intranasal route. The result, mentally and morally, was most satisfactory. His natural mental acuteness returned, and his habits completely changed—a result ascribed, by those who knew him, to the operation.

Mental Depression following Sinus Infection.—I had a very intractable case of suppuration of the maxillary antrum and probably of ethmoidal and frontal sinus suppuration. After a considerable time he left off treatment. A few months later I heard he committed suicide because of the continual trouble. He was always in a “depressed mental condition.”

Influence of Sinus Infection on Responsibility.—In youth, aged twenty-two, with suppurating maxillary antrum, there were marked symptoms of melancholia and fear of suicide. Patient rapidly recovered after operation.

The Influence of Accessory Sinus Infection upon the Mental Condition.—A. W.—, married woman, aged twenty-eight; two children, youngest aged one year. Husband, a medical man, noticed that for about eight months his wife had become moody, irritable, and uninterested in all that she formerly loved. Sometimes hysterical and indifferent to her children, whom she formerly loved very dearly. Her husband, apprehensive, dare not leave her alone. She was seen by several eminent physicians, and intestinal toxæmia was diagnosed and treated, but without result. There was indefinite history of nasal discharge. Sphenoidal sinus found affected. This was opened freely. In three weeks she was a new woman, or rather “her old self,” bright and cheerful. Three years have elapsed and no recurrence. No family history of any mental trouble.

Group II.—Complications following Intranasal Operations.

(A) Septic.

Osteomyelitis following Radical Antral Operations.—Some years ago I performed a radical antral operation (Caldwell-Luc) on a young anæmic, unhealthy woman. The antrum was vigorously curetted with a sharp spoon. She left the hospital at the end of a week and returned a few days later with swelling of the cheek and slight fever. She developed septic osteomyelitis of the upper jaw, and died a fortnight later from meningitis. I know of a similar case which was under the care of a colleague who considered the osteomyelitis to be due to the vigorous curetting.

Septic Pneumonia following a Nasal Sinus Suppuration Operation.—This case occurred under the care of a colleague, and, in his absence, was seen by me. A nurse, aged fifty, had chronic suppuration of the right antrum of a few years' duration. She also had occasional attacks of bronchitis. A simple intranasal antral operation was satisfactorily performed. The anæsthesia was a little deeper than necessary. Four or five days after the operation, the evening temperature rose to about 101° F. and fell to 99° F. in the morning. Expectoration increased and became purulent. Three to four weeks after the operation the patient died of broncho-pneumonia.

Post-mortem: Purulent broncho-pneumonia with small abscess formation.

The antral operation was entirely satisfactory, and there was no gross nasal disease

Meningitis following Submucous Resection.—Sergeant C—, aged twenty-seven. March 4, 1916: Complained of "a feeling of always having a cold for six months and loss of smell." March 14, 1916: Submucous resection performed and adenoids removed. March 18, 1916: Nose doing well, slight sore throat, temperature 99° F. March 22, 1916: Discharged as fit from hospital; nose in good condition.

His wife gives the following history of the period he spent at home: March 22, 1916: "Arrived home appearing well, but not so lively as usual." March 26, 1916: "Went to bed complaining of severe headache and refused food." This condition continued until March 29, when he had delusions, and a doctor was called in. He was quieter next day. April 1, 1916: He became violent and complained of pain in the back. April 2, 1916: He was admitted to hospital, and the diagnosis of meningitis was made. His cerebro-spinal fluid and blood were examined for organisms, and streptococci were found. The cerebro-spinal fluid contained much pus. April 3, 1916: He was very restless, had active delusions, and tried to seize at imaginary objects. He was partly unconscious, but could be roused to answer, though incoherently. April 4, 1916: Died. *Post-mortem*: Pus was found in his ethmoidal cells and sphenoidal sinuses, and they contained streptococci.

Septic Osteomyelitis of Maxillæ and Frontal Bone; Extradural Abscess and Meningitis.—(1) A fireman, about seven years ago. Old-standing case of polypi; operation on left antrum followed by spreading infection, many abscesses, and death from meningitis. *Post-mortem* examination showed perforation through roof of sphenoidal sinus.

(2) Corporal L—, at a military hospital in January, 1916. Old-standing case of polypi. A surgeon removed several polypi; then operated on the left antrum intranasally; later performed a submucous resection of the septum; he was then prevented by illness from further treating the case, and I saw the man. Swelling of left face and tenderness; an incision exposed necrosis of maxilla; subsequent spread of infection and several extensive operations performed, resulting in removal of most of both frontal bones and exposure of a very large extradural abscess over the frontal lobes; removal of the lesser wing of the sphenoid on the left side, both maxillæ and ethmoids; opening of both sphenoidal sinuses. At the second operation the vertical plate of the ethmoid was found necrosed and came away with the crista galli. Death eventually took place from meningitis, but not for three to four months after the first signs of the spreading osteomyelitis. Indeed, one felt that if the whole of the frontal and ethmoids and maxillæ (upper parts) had been removed at the first operation, the man might have been saved.

Complications following Intranasal Operations.—(1) Very many hospital throats after septum operations.

(2) Cases of septicæmia (mastoids, pneumonia, etc.) after septum, eurenting, and sinus operations.

(i) Case of apical pneumonia after antrum operation in man. Recovery. No tubercle bacilli.

(ii) Apical pneumonia after frontal sinus operation in man. Recovery.
(iii) Pneumonia, mastoid and lateral sinus infection after septum operation in girl. Seen in consultation.

(iv) Mastoid operation in man after septum operation. Seen in consultation. Death.

(v) Two cases of erysipelas in women, one after maxillary antrum operation, the other after ethmoid curetting. Recovery. *Both had erysipelas formerly.*

(vi) Two cases of fatal meningitis in adult girls after ethmoid curetting. In both cases onset about fifth day. One case explained by an epidemic of pneumococcal throat in ward at time, and by house surgeon having also a "throat." In second case patient was found to have been sea-bathing a week before operation and to have an acute rhinitis.

(vii) I have seen, in consultation, patients, after septum operation by an operator with *atrophic rhinitis*, suffer from septic troubles.

(viii) Influenza soon after operation on septum has been very harmful. In one case the mucous membrane sloughed away, leaving a large perforation.

Sinus Disease with Tic Douloureux due to Implication of the Nasal Nerve in the Anterior Fossa.—C. M.— had complained of severe pain darting up through the right canine tooth to the cheek and to the top of the head, and a few weeks later involving all three branches of the fifth nerve—viz. supra-orbital, branches of the infra-orbital and of the inferior dental. The violent pain recurred several times a day, and speaking and laughing, sometimes touching the cheek or nose, or blowing the nose, brought it on. Various remedies had been tried with no avail. Ocular causes were excluded. Some relief was obtained by injection of absolute alcohol in the region of the foramen rotundum, but it was partial and temporary. Patient said she had no nasal discharge, excepting "soppiness," which corresponded to an infected right ethmoidal labyrinth. Transillumination of the antra was good. An attempt was made to resect the right superior maxillary nerve, but on exposing the nerve at the exit from the maxilla, one entered the antrum through the softened bone of the nerve canal. The antrum was thereupon explored by the suction syringe and pus withdrawn; the same process on the left side withdrew muco-pus. Culture showed that this pus was due to pure *Staphylococcus albus* infection. A double per-nasal antral operation was performed. Relief was considerable but incomplete. Subsequently an operation was performed on the diseased ethmoidal cells on both sides, by cautiously clipping with small cutting forceps. Meningitis developed and the patient died on the fourth day after operation. I was at a loss to understand why the patient developed meningitis, as the operation had apparently been attended by no difficulty at all.

Post-mortem examination revealed that death was due to meningitis resulting from erosion of the ethmoidal cell on the right side, corresponding to the position where the nasal nerve crosses the cribriform plate in this part. The roof in this cell was quite eroded, and the dura mater was adherent around the opening. On the opposite side the cribriform plate was normal. That the meningitis originated in the region of the eroded cell, and that it was not due to the operation, seemed clearly shown, not only by the gross appearances, but because the dura mater was so intimately adherent all round the erosion. This could not have taken place within so short a period had it been traumatic.

The chief points of interest in the case are: Firstly, that the tic douloureux corresponded to the right side, whereas the sinus disease was bilateral, and was probably due to involvement of the nasal branch of the fifth nerve while crossing the diseased cribriform plate.

I have never heard of a similar condition being reported, and the possibility of such a trap to the operator was unknown to me. But I am convinced that in old-standing cases of ethmoiditis, infection of the meninges may occur through lymphatic and vascular communications apart from direct injury of the cribriform plate or roof of the ethmoid cells.

(B) *Involving Extranasal Regions.*

Squint and other Eye Symptoms—Diplopia, "Black Eye."—

(1) Miss D—. Curetting of ethmoid for suppuration.

(2) L. A.—, male, aged thirty-seven. Seen in March, 1914, on account of asthma; the right eye directed upwards and outwards. Previous operation for asthma in a provincial town (? removal of middle turbinal). Operation was followed by extensive "black eye" and squint.

General Diseases.—(1) Case of scarlet fever following Caldwell-Luc operation on antrum.

(2) Case of gummatous ulceration of septum following intranasal operation. An officer on whom operation had been performed—removal of anterior end of right mid-turbinal; this was followed by adhesion of the turbinal to septum, accompanied by frontal headaches. Operation of submucous resection and division of adhesions. Some weeks after this the patient developed a typical gummatous ulcer on the left side of the septum. Twelve years previously he had a primary sore and had been given mercury for three months only.

Death after Removal of Nasal Polypi.—A man, middle-aged; in the wards about fifteen years ago. I snared an ordinary-looking polypus, and exerted a moderate amount of traction, certainly less than I have often used since. The man fell back dead without any sign. The pathologist made a *post-mortem* examination and found a gap in the cribriform plate, but could not find any trace of a traumatic fracture. It seemed to be a case of congenital absence of bone.

Ocular Complications following Sinus Infection.—A lady with old-standing nasal suppuration, chiefly ethmoidal. I curetted the latent ethmoidal cells, possibly a little too much, yet certainly not violently. Some orbital fat was noticed. Later there were adhesions which limited the movements of the eyeball on that side.

Osteoporosis of the Ethmoid in Old Age and its Relation to the Removal of Polypi.—The ethmoid bone normally undergoes a process of rarification or cancellation during nearly the whole of life, but reaches a very advanced stage in old age, rendering it extremely brittle or "biscuit-like." It assumes a morbid degree in three forms quite apart from sinus disease:

- (a) Pneumatic enlargement of the middle turbinal.
- (b) Pneumatic expansion and bulging of the bulb.
- (c) Uniform osteoporosis of all its elements.

It is the third variety which is of special interest, particularly in old people who are the subjects of polypi, since there is no gross evidence to arouse suspicion of its presence. This, however, is soon seen by the

large amount of bone which often accompanies the polypus when snared. In one instance the cribriform plate was identified, the patient, an old woman, dying soon after with meningitis. Evidence of this osteoporosis has been plentifully seen in "out-patient" material and structures removed *post-mortem*.

Specimens: Nasal polypi removed from old patients with bone attached. Slides showing osteoporosis.

(C) *Involving Nasal Structures.*

Adhesions between Middle Turbinal and Septum leading to Obstruction and Rhinorrhœa.—Mrs. N——. Previous operation by a surgeon for nasal obstruction, followed by attacks of sneezing and rhinorrhœa (symptoms not previously present). Division of adhesions cured the condition.

Swelling of Mucous Membrane, causing more Obstruction than before Operation, and persisting for some Weeks.—Typical example: Fleet-Surgeon S——. Patient had long-standing deflection of septum. Alyn and hemisine used for a submucous resection.

Results of some Operations upon the Septum.—(1) Asthma.

(2) Flapping septum: therefore better results from putting back pieces of cartilage at end of operation.

(3) Falling in of tip of nose.

(4) Perforation of septum—sibilant breathing.

PROCEEDINGS OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION.

Niagara Falls, Canada, June 1, 2, 3, 1915.

Papilloma of the Larynx.

(Continued from p. 265.)

Dr. ALLEN B. THRASHER (Cincinnati): I have not seen cases of papilloma of the larynx very often in adults, because these intralaryngeal growths assume a different character; in children, however, they are very frequently encountered. In these cases one should never operate without telling the patient that the operation probably will have to be repeated. The larynx must be kept clear until the child is fifteen or sixteen years of age. There is always danger of recurrence while the larynx is small. I have kept a tracheotomy tube in for four years without any trouble. It was removed in the meantime, of course, but not left out entirely. In this case I could not see the patient regularly. This patient is now perfectly well, and has had no trouble since he was sixteen years old. He wore the tube constantly from his twelfth to his sixteenth year. I have found tracheotomy more easily performed the second time than the first. I am doubtful about the advisability of massage. It seems to me that it would increase the blood flow to the larynx, and this increased blood supply would be apt to stimulate growth. I have had no experience in this regard, but it does not appeal to me as being a scientific procedure. I believe the fact that

Dr. Hubbard has not had trouble with his cases is due to accident. I would be afraid to try it in cases of papilloma. In other cases it may facilitate the return of the voice. In cases of papilloma of the larynx, as in cases of warts elsewhere, I have used nitrate of silver. The mucous membrane of the larynx is much more easily destroyed than that of other parts, but nitrate of silver will not destroy it.

Dr. JOHN F. BARNHILL: It has seemed to me, judging from my own experience, to be impossible, under certain circumstances, to get all the growth out, including the base of the mucous membrane. Dr. Lynch's method is largely in the open, and that is why it will prove successful. In all cases in which I have absolutely cured this class of disease, I have opened the larynx thoroughly and have seen that I actually removed all of the growth. Laryngo-fissure is not satisfactory in all cases. To open the larynx, to see what is there, and to thoroughly remove it under antiseptic precautions, is a plain surgical procedure, and, with proper closure of the wound, is, it seems to me, the best method.

Dr. HARMON SMITH: A few days ago I had the opportunity of seeing Dr. Lynch operate on a papilloma of the larynx in a boy fifteen years of age. The larynx had been thoroughly cleared out by another laryngologist. The growth recurred. For a number of years the patient wore a tracheotomy tube, with no particular effect on the growth. He finally fell into my hands, and I used fulguration. Then another used radium. The growth would disappear partially and then recur. There had remained a fibro-papillomatous mass in the anterior commissure, in the sub-glottic space. Dr. Lynch operated, curetting out this fibro-papillomatous mass thoroughly. He could hold the cords aside and look underneath. I think Dr. Lynch has devised a surgical procedure for these cases. Dr. Yankauer has invented a method by which fulguration may be used and oxygen sent in in a current; but there is not the deep burning that is necessary for the removal of these deep growths. Fulguration will certainly take off the skin, but that is not sufficient. There is a difference in the infectivity of these laryngeal warts. In studying a series of cases of warts in children I myself got warts on my hand. There is a great difference between the multiple laryngeal warts in children and those in adults. In adults it is much easier to get rid of them. Radium, in two or three applications, will remove them in adults, but not in children. We do not know the true pathology of these papillomata. If we destroy the mucous membrane at the base and remove the blood, we may be reasonably sure that the growth will not recur.

Dr. LEWIS A. COFFIN: In the clinic I feel hopeless when I see a lot of children with papilloma of the larynx. We have records, however, of cases in children of removal by radium with no recurrence. A case was successfully treated by Dr. Abbe. Another case was that of a woman, forty-three to forty-five years of age, a singer, who was treated by two applications of radium, lasting from one-half to three-quarters of an hour, with the disappearance of every vestige of the growth. There has been no recurrence for more than three years. I have now under me care a man from whose larynx I removed growths by the direct method. I treated him with applications of monochloroacetic acid, but the larynx filled up completely. One year ago, when he phonated, the larynx was entirely filled with the growths on the arytaenoids and in the anterior commissure. Dr. Abbe sent me 100 mgrm. of radium in a tube; this was applied to the growths, and in forty-eight hours they were

entirely gone. After the removal of the growth on the epiglottis and the one on the arytaenoid had grown smaller, I could see the large growth on the anterior commissure. Another application of radium was made to this for an hour. Five days ago, when I saw the man, I found the growths had simply withered up. There is still a small growth on the arytaenoid, and a ridge on the epiglottis.

Dr. EMIL MAYER: I would like to hear the views of the members regarding the aetiological factors concerned in these growths. I have had two cases in adults working in tunnels and breathing compressed air. It seems rational that such a thing might occur. Removal by the indirect method has also resulted in the complete disappearance of the growths. If tracheotomy is employed, the tube must be worn for quite a number of years. I have had a case which is illuminating in this connection, and which shows that there is danger after tracheotomy. A little child had so large a papilloma in the larynx that tracheotomy was necessary. While I was cleaning the tube and putting it back again the child nearly passed away. After that I had two tubes, and as soon as one was out the other was put in, and in that way managed very well. The child lived quite a distance from me. One day while at play the child grasped the tape attached to the tracheotomy tube and pulled it out, gave one cough, and, before help could come, died.

Dr. D. CROSBY GREENE, jun.: Recurrence followed in a case in which I operated, and the patient went to another laryngologist, who removed the growth by thyrotomy under direct vision. Six months later I saw the patient again, and the larynx was entirely filled with papillomatous tissue. Dr. Lynch's method will not be sufficient unless the immunity of the patient has been established. Within the past six months I have seen a case in which the patient presented warts on the skin simultaneously with papillomata of the larynx. Removal of the papillomata in the larynx was followed, within a short time, by disappearance of the warts on the skin.

Dr. HENRY L. SWAIN: Many years ago I had under my care two cases of papilloma of the larynx, one in a boy, the other in a woman thirty or more years of age. The boy was intractable, and passed out of my hands. Nine years afterward he coughed up the remains of his papilloma. I have seen him within the last two years, and he has no growth at all. If he had stayed with me his single papilloma would probably have become multiple. The woman was treated in various ways. I cauterised with pure nitrate of silver and with electricity; I curetted, and rubbed in lactic acid, and despite all this the papilloma returned. Some time ago Dr. Sperry called me in to see a patient, thinking laryngotomy was necessary. I found my old patient, the woman, with several papillomata. She had coughed off one growth, but the others had remained the same for some years. There was never any obstruction in her case. Whether they will become malignant of course I do not know. In another case I have used alcohol sprayed on the surface of the papilloma, and have certainly prevented the necessity of instrumentation. I have done nothing else in this case, and the larynx is now entirely free. The growths have reappeared four different times; but for ten years I done nothing but spray the surface with alcohol. This case is subject to the criticism that the growths might have disappeared if left alone; but I hardly think that true, as they disappeared so quickly under the treatment. At one time there were five distinct papillomata in this case.

Dr. WILLIAM E. CASSELBERRY: In the glamour of the new we are apt to forget the merits of the old. No one has mentioned the old

galvano-cautery. At the last congress in Washington I presented a cautery which I devised, and which I have been using ever since. I cannot understand why fulguration possesses any advantage over the galvano-cautery. After removal of the growth with the forceps, by either the direct or the indirect method—and I have sometimes used both in the same patient—and after curetting (and I have never been able to curette satisfactorily in my own mind, always feeling that I have left shreds), the cauterisation of the base with the galvano-cautery is desirable. It is the easiest and most convenient method.

Dr. HARRIS P. MOSHER: Did I understand Dr. Hubbard to say that the tracheotomy tube worn for any length of time interferes with the return of the voice? I have not found that to be the case. This particular part of his theory, while very pretty, is not borne out by the facts.

Dr. JAMES E. LOGAN: I have had the very best results after curettement. Within the past two years I have had two cases of special interest. In one case there was a suspicion of carcinoma. I removed the growth a number of times, large pieces of what appeared to be fibrous tissue being taken out, and followed this with curettement. There has been no return. Another case was that of a woman, sixty years of age, the mother of nine children. A few years ago she had every evidence of carcinoma. After removing as much as I could of the growth, I used the galvano-cautery to remove the rest. To-day she has as good voice as ever. In another patient, forty years of age, I have prevented recurrence for seven years by the use of the galvano-cautery. Fulguration cannot be localised as can cauterisation with the electrodes, suggested by Dr. Casselberry.

Dr. ROBERT CLYDE LYNCH: My experience with papilloma of the larynx covers sixteen cases. I will give briefly the histories of two or three, which will illustrate the results obtained with the method which I have devised. The first case was referred to me by Dr. Jackson, by whom the patient, a woman, had been treated for two years. He had operated every month or six weeks for recurrence of papilloma of the larynx. The patient then removed to my neighbourhood. I attempted to operate, as Dr. Jackson had done, with his forceps and other instruments. The method in my hands was entirely unsuccessful. At that time I began to use the suspension apparatus. The patient was anaesthetised, and I carefully dissected out every portion of the growth which could be seen, both above and below the vocal cords and around the epiglottis. I cleared the area entirely. I suspected that I would have a good deal of post-operative œdema, and kept the patient in hospital for several weeks. Healing was perfect. That was a little more than two years ago, and there has been absolutely no recurrence since that operation. The second case was that of a little boy, reported last year. The patient came into the hospital very much cyanosed, and the fright of coming into the clinic practically stopped his respiration. Tracheotomy was performed and the tube left in place. I thought that would be sufficient to clear up the papilloma, but it had no effect. I operated nine times by the direct method, clearing out each time as much of the growth as I could see. Each time the papilloma recurred. Then I attempted thyrotomy. With the tube in place I opened the thyroid. The child was two years old, and this was very difficult. I was not successful in cleaning out the larynx entirely, and in the course of three weeks it was again filled with papilloma. I left the child alone for six months, with the tracheotomy tube in place. In the meantime I was trying to learn some new method for dealing with

such cases. Finally I suspended him, and dissected out the growths as far down as the end of the tracheotomy tube. That was two years ago, and I saw the patient just before I left home. There was no recurrence. I took out the tube twenty-four hours after doing this dissection. It was the first time in two years that the child had been without it. He had some voice at the end of twenty-four hours, and in two weeks his voice was as good as ever. The third case was that of a negro woman. I dissected out the papilloma in the same way, and she returned home. She was very religious, had attacks of "hysteria," when she shouted and sang, as the negroes do in their meetings, and at the end of six months she came back with papilloma of the larynx. All my operative work in this case had been devoted to the region above the vocal cords. I thought this the first case in which I would have to report recurrence after operating with suspension. In looking over my records, however, I found that our previous efforts had been confined to the region above the cords, whereas the present papilloma was below the cords. This was dissected out, and there has been no recurrence. It is impossible to remove papillomata completely by any method of punching or pinching or biting, using the forceps in one hand and some other instrument in the other. It is for this reason, I think, that we have so much recurrence. In the sixteen cases in which I have operated by dissection with suspension there has been no recurrence up to the present time.

Dr. HUBBARD (closing the discussion): I think Dr. Lynch has devised the most surgical and precise method of dealing with these growths. All, however, have not the apparatus for this particular work, and so there is a field for the older procedures. I have found it a very useful procedure to put interrupted stitches in the tracheal ring. One must have a free field, snipping off, if necessary, all the isthmus which obscured the view. I usually take up the trachea and put in silkworm gut, about one-third back, through the ring in a child. In other words, I want it as firm as possible. The suture is placed between the cellular tissue and the tracheal ring, one stitch on either side, drawn together, and the ends left long. The ends are brought out on the neck and fixed with adhesive plaster. One can then pull on these and draw the trachea and the larynx forward, getting a glimpse of the lower end of the larynx. Otherwise the curetting is done blindly. Thorough curettage of the larynx can be accomplished by this method with curettes of various sizes and angles. If the papillomata are "ripe" they can be gotten out at the base; those that are in a state of active growth cannot be entirely removed. I always inspect the growth from above prior to curettement. In using the trichloroacetic acid I simply moisten a small swab, smear with the crystals, and go over the surface with this. The tube is fenestrated, it is inserted in the larynx, and is left there. I want to call attention again to massage as a factor in producing the condition which brings about the restoration of the normal processes of the larynx. Any simple method like massage is superior to the absolute rest of the larynx induced by the prolonged wearing of the tracheotomy tube.¹

Some Statistic Observations on Oto-Laryngologic Diseases among Negroes, based on Fifteen Hundred Cases.—Dunbar Roy (Atlanta).—It is surprising how few negroes present themselves for nasal diseases. Out of the total 1,500, only 341 came for nasal com-

¹ For further information on "Suspension Laryngoscopy for Laryngeal Papilloma" see JOURN. OF LARYNGOL., RHINOL., AND OTOL., vol. xxix, 1914, p. 71.

plaints. Spurs and deviations are very rare. The writer has never seen a deviated septum in a full-blooded negro. In the writer's opinion, this is due to two causes. In the development of the maxillary bones you never see a contracted and high-arched palate among negroes. This tends to substantiate Mosher's argument as to the importance of the premaxillary ridge in the causation of septum deviations.

(2) Traumatism as a causal factor is rare, because of the protruding brow and soft resilient cartilages externally. Acute inflammation of the accessory sinuses was exceedingly rare, due, in the writer's opinion, to the free ventilation in the nasal cavities. Only chronic necrosing ethmoiditis with polypi occurred more frequently than other chronic sinus diseases. Hay fever occurred in only two cases, and did not differ in symptoms from that seen in the white race. Atrophic rhinitis was seen in one case only, which would seem to disprove that theory making large nasal passages a predisposing cause for this condition. No case of chronic maxillary abscess was seen. It is a well-known fact that few negroes have bad teeth. Syphilitic lesions were frequent, as also purulent rhinitis in the young, which readily yielded to antisiphilitic treatment of the old *régime*—*i e.*, mercury and iodide of potassium.

(3) Pharynx, epipharynx, and larynx. There were 106 cases involving these parts, by far the largest percentage. Diphtheria is exceedingly rare in spite of the poor hygienic surroundings of many of these people. Laryngeal tuberculosis occurred only twenty-three times. Laryngeal and pharyngeal syphilis, 270. Adenoids and enlarged faucial tonsils occurred 296 times, which refutes the statement made several years ago that adenoids are very infrequent among the negroes.

Dr. CHARLES W. RICHARDSON: In the main my observation is in accord with Dr. Roy's; but this is not the case with regard to the apparent immunity of the negro from diphtheria. For a number of years I had charge of the diphtheria ward in the Government Hospital in Washington, which was, in fact, the municipal diphtheria ward. There were practically no negroes in it. I do not remember a case of laryngeal diphtheria in any of the wards. I never intubated a negro child in my whole experience. My experience is not in accord with Dr. Roy's with regard to the presence of adenoids and enlarged faucial tonsils in negro children. I think some of the worst cases of adenoids I have ever seen and operated on have been in negro children. Some years ago I was inclined to believe that negroes do not have this condition; but latterly, probably in consequence of school inspection, they come into the clinics in great numbers. Syphilis among negroes is quite general in Washington as well as in Atlanta.

True Myxoma of the Naso-pharynx: Report of Two Cases.—
Virginus Dabney (Washington).—Extreme rarity of true myxoma anywhere in the body, but especially in the naso-pharynx, leads to report of two cases. Some pathologists reject entirely the term, believing no such pure tumour exists. However, sections show absolute absence of any fibrous elements. Case 1: Tumour seen on drawing forward soft palate. Under ether, large adenoid curette fitted over growth which was removed from attachment to the basilar process. No recurrence after ten months. Case 2: Two growths found at operation. Only one could be seen at examination, smaller attached to basilar process, larger to posterior ethmoid. Both were divulsed with large adenoid forceps. Patient had had similar growth removed eleven years before. Photographs of growths and of microscopic sections were given.

Dr. HARMON SMITH: This must be the exception which proves the rule. It has been definitely stated by many histologists and pathologists that true myxomata do not occur in this region. In the majority of instances myxoma has sprung from the ethmoid or somewhere else. Mixed fibroma and myxoma, on the other hand, arise in the naso-pharynx. So far as I know, there has been no other case reported of true myxoma springing from this region.

Dr. JAMES E. LOGAN: I would like to ask the nationality of these patients, especially the one with the very large growth. It often happens that these growths appear in individuals of certain nationalities. Those of Scandinavian birth are more apt to have them than any other class of patients. I have had two pathologists at variance on two cases, one operated by myself and the other by Dr. Fenger. One pathologist said there was every evidence of myxoma, the other that it was fibroid or myxofibroma. The tumour in one case—a boy of Swedish nationality—was attached to the basilar process.

Dr. DABNEY (closing the discussion): One patient was German, the other American. What Dr. Smith says about the origin of these growths is the excuse for this report. They are supposed never to occur. I had the specimens examined by very skilled pathologists in Washington, at Howard University, and also at the Government School. They are true myxoma. I have looked up the literature, and there are no other cases reported of true myxoma of the rhino-pharynx.

The Surgical Anatomy of the So-called Capsule of the Faucial Tonsil.—G. Hudson Makuen.—The so-called capsule of the faucial tonsil is not a capsule at all, in a strict sense of the term, and it consists, in part at least, of that portion of the intra-pharyngeal aponeurosis in a recess of which the tonsil attaches itself during the course of its development. The intra-pharyngeal aponeurosis is a broad membrane, having its attachment above to the base of the skull, and, extending downward, it not only separates the tonsil and the palatal pillars from the superior constrictor muscle and other important tissues in the cervical region; but folds of this membrane protrude themselves between the tonsil and the pillars of the palate, and the anterior fold, when it protrudes itself well in front and below the tonsil, constitutes what is known as the plica triangularis or plica tonsillaris. In the course of its development in embryo and during infancy, the tonsil appears to appropriate a portion of the connective and musculo-fibrous tissue with which it is in juxtaposition, and finally, in adult life, it becomes firmly attached to this membrane to which has been given the name intra-pharyngeal aponeurosis, and a portion of which seems to constitute the so-called capsule of the tonsil. As usually performed, therefore, a complete extracapsular tonsillectomy must leave a window resection of the intra-pharyngeal aponeurosis, not only exposing the palatal pillars and the superior constrictor muscle, but opening up avenues of infection in the deeper regions of the neck. A more desirable operation, which may be called an intracapsular tonsillectomy, or, better still, an intercapsular tonsillectomy, is one in which the tonsil is removed with only the thin innermost layer of the capsule, the major portion of it being left in the pharynx as a complete lining for the fossa, where it serves as a strong wall of defence against infection in this region. This intra- or intercapsular tonsillectomy may usually be done easily and accurately with an ordinary snare in connection with the Sluder tonsillotome, and sharp-cutting instruments are not required except in those rare instances where pathologic adhesions have formed

between the tonsil and the mucons membrane covering the adjacent pillars.

Dr. E. WILLIAM CASSELBERRY (Chicago): I am very glad to have heard this definition of terms. I have been doing the same operation that Dr. Makuen has been doing, but whereas he called it the intracapsular method, I have been calling it the extracapsular method. I still object to his term intracapsular for either his way or mine. Intercapsular would be a better term than intracapsular, it seems to me. Whether the capsule develops from the aponeurosis or from the tonsil itself matters not. I would not, in either event, forget the word capsule, for surely, as we see it, it is a capsule of the tonsil. The tonsil is enveloped in a smooth membrane which can be separated from the major portion of the aponeurosis. The smooth dissection of the capsule from the major portion of the aponeurosis is, I believe, the best operation. It results in no distortion of the pharynx. In the majority of instances it is unnecessary to cut much of the plica or mucous covering of the pillar itself. Cutting the covering of the pillar is one of the things which results in infection and distortion. I, too, have been struck by the difference in the thickness of the capsule. Sometimes, when I have exposed a piece of muscle, I have thought I have gone too far, and when I have tried to get only a thin portion, I have got a thicker portion.

Dr. J. GORDON WILSON: If the surgical anatomy of the tonsil is different from the anatomy, I miss Dr. Makuen's point. I cannot understand how he can tell the part of the covering of the tonsil which comes from the aponeurosis of the muscle a part of the capsule of the tonsil. Poire illustrated that in his text-book. That part is not capsule of the tonsil. The capsule of the tonsil normally is very thin, as may be seen when it is sectioned. It is separated from the other tonsillar tissue by a thin layer of areolar tissue. Toldt's anatomy gives the best description of this. The crypts go right down to this connective-tissue sheath. As age increases this sheath thickens; it is also thickened by inflammation.

Dr. GEORGE E. SHAMBAUGH: I cannot follow Dr. Makuen in tracing the thickness of the capsule of the tonsil. As I understand it, this thickness increases with age, and the tonsil becomes more and more adherent with age, according to Dr. Makuen's idea. In my experience, this is not the case. I have taken out the tonsil in people of seventy, in whom it is as loosely adherent as in infancy. If there is adherence it is because there has been a great deal of inflammation, and not because of the physiological character of the tissue.

Dr. HENRY L. SWAIN: I have obtained a good deal better idea of what the capsule really means by studying the lingual tonsil than by studying the capsule of the faucial tonsil, especially by studying the follicles, which heap themselves up around the tonsil. The follicles, accumulating around the tonsil, make a complete limiting membrane. If this is taken out it forms an impression or mould in which the tonsil lies. The larger the tonsil the thinner the capsule, and the smaller the tonsil the thicker the capsule. If the tonsil is dissected out in the cadaver, it is found that there is, in a child, a very slight line of demarcation where the covering membrane of the tonsil ends and the posterior pharyngeal wall membrane begins. Young children have very little line of demarcation between the connective-tissue on which the tonsil rests and the posterior layer of aponeurosis.

Dr. JOHN F. BARNHILL: Dr. Makuen spoke of splitting the capsule. I could not understand that at the time, but having studied the tonsils which I saved, I can now see how one might speak of splitting the

capsule, or, rather the tissues around it which are removed with the tonsil. I have brought along a large number of these tonsils, which demonstrate, I think, that there is an external capsule which is connected with the deep tissues of the neck, and another which has nothing at all to do with this. One of the tonsils in this collection, by the way, shows a portion of the styloid process.

Dr. LEWIS A. COFFIN: My conception of the tonsil with its capsule is about that of a tangerine with its peel. The outside skin of the tangerine can be easily removed, without the fibrous covering just over the pulpy part of the tangerine, which is connected with the interfibrillar tissue of the fruit. This fibrous covering, to my mind, is the capsule of the fruit, and not the outside rind. So it is with the tonsil. If there is repeated inflammation, there will be thickening of the outer capsule.

Dr. GREENFIELD SLUDER: I have listened especially for one point which has not been cleared up in the discussion. I have been very much interested in this subject for three or four years, and feel very much gratified that Dr. Makuen should have used the principle of picking up the tonsil, to which I called attention before the laryngological section of the American Medical Association in 1910. The technique was not original with me: it is the technique of Physick, published in 1827. It has been strengthened, but not changed. The point to which I referred, which has not been made clear, is the capsule splitting process. Is there a delimiting membrane which bears the crypts at one end? Is there a fibrous delimiting membrane which covers the posterior constrictor and pillars, or is the crypt open on its lateral aspect, or is it closed by the envelope? (Dr. Makuen answered that it is closed by a very thin membrane.) If that were uniformly the case, this technique would be the ideal method of tonsillectomy; if it be not the case, the turning of the blade across does not remove the last cell of lymphoid tissue. If it does not remove the last cell of lymphoid tissue, it is not a success, because the activity of this lymphoid tissue will bring about a recurrence of the condition for which the operation was performed. Lymphoid tissue will grow up into the wound from the lingual tonsil, developing all the clinical symptoms which the case presented originally. I have seen that happen.

Dr. MAKUEN (closing the discussion): Dr. Casselberry has referred to terms and definitions of terms. I used the term intracapsular tonsillectomy chiefly because no distinction has been made between what Dr. Wilson has called the true capsule—and which we all recognise as the true capsule—namely, the thin membrane, and the posterior aponeurosis to which the tonsil becomes so closely attached. The English and French schools of anatomists did not distinguish between these two structures. I use the term intracapsular tonsillectomy because no distinction has been made between the true capsule and this membrane to which it is so closely attached at times that it seems to be a part of the capsule itself. I have found that after mutilation of the tonsils this section of intra-pharyngeal aponeurosis is taken out with the tonsil, and it has been called extracapsular tonsillectomy, where all the capsule has been removed. I object to a sharp instrument because it is so easy to go through this membrane. When you cut through this intra-pharyngeal aponeurosis and get the finger down into the loose tissue between that and the muscle, you simply have to tear things out. That is why the finger dissection so rapidly went into disrepute. The finger nail made tears in the muscle which caused great

contraction. We also do the same operation and try to get the same results, but the fact remains that we do get deformities in many instances. Someone in New York reported 100 dissections with 80 per cent. of deformities of the palate. We do not all do the beautiful operations which some do, and unless we are very careful we will get these unfortunate results. That is why I have suggested the technique detailed in this paper.

Abstracts.

PHARYNX.

Gile, Ben C.—The Indictment of the Tonsil.—“Annals of Otology,” etc., xxiv, p. 747.

An interesting paper showing how the tonsil may be the *fons et origo* of acute nephritis, rheumatism, arthritis, goitre, tuberculosis, deafness, and various neuroses, such as cesophageal spasm, recurrent cough, spasm of the glottis, lingual neuralgia, and blepharospasm. That chorea and epidemic cerebro-spinal meningitis may also be traced to a tonsillar focus of infection is not mentioned, but, as the author remarks, the charges in the indictment might be multiplied. *Macleod Yearsley.*

Certel, T. E.—Eye Adenoids and their Relation to Throat Adenoids. The Author's Modification of the Adenotonsillectomy Operation. “Annals of Otology,” etc., xxiv, p. 763.

The author concludes that: (1) Eye adenoids (follicular conjunctivitis) indicate the existence of throat adenoids. (2) Hasty and rough surgery in the throat is productive of irreparable damage. (3) Adenectomy should be performed, as far as possible, under direct observation. (4) The roller forceps for diffuse pharyngeal adenoids is of value, because it removes them with a minimum amount of damage to the mucous membrane. (5) The silver clip is the best general method of controlling tonsillar bleeding. *Macleod Yearsley.*

Burns, L. J.—The Use of Quinine and Urea Hydrochloride as a Local Anæsthetic in One Hundred and Forty-eight Cases of Tonsillectomy. “Annals of Otology,” etc., xxiv, p. 841.

The author considers that the value of this mixture as an anæsthetic is established for the following reasons: (1) Rapidity of action. (2) Absolute non-toxicity in even as strong solutions as 10 per cent. (3) Always producing sufficient anæsthesia to complete operation without the necessity of stopping to make further application or injection. (4) Marked diminution of after-pain and discomfort. (5) Superior advantages over cocaine and its derivatives, due to its nonsystemic action. (6) Absolute absence of troublesome primary or secondary hæmorrhage; this being one of the frequent and dangerous drawbacks of tonsillectomy under local anæsthetic. (7) Readiness with which the solution may be sterilised, frequently repeated high temperature producing no chemical or physiological change. *Macleod Yearsley.*

NOSE.

Roy, J. N.—*Ozæna and the Different Races of the World.* "Annales des Mal. de l'Orielle, du Larvux, du Nez, et du Pharynx." vol. xl, no. 8.

In this article the author relates his experiences on the bearing which enology has to ozæna. During the past ten years he has, through a series of tours, been brought into contact with the principal races of the globe. He divides the races concerned into three groups—white, black, and yellow. The Malays and Redskins are really descendants of Mongols; the pigment of their skin, form of eyelids, development of malar bones, flattening of the base of the nose, and thick hair all support this view. Moreover some Indian tribes of South America have linguistic expressions much resembling portions of the Japanese language, and there are ruins in Mexico with inscriptions, which are vestiges of Buddhist temples. With regard to the white race, the author only relates what he has observed when it has been blended with one of the other two. During a voyage around the Dark Continent, about 5000 Negroes in twenty-five different colonies were examined. In several parts the author penetrated the interior at a great distance from the coast, and was enabled to scrutinise 100 tribes. After careful research amongst the natives of Africa no ozæna was discovered. Especial care was devoted to the examination in mixed races, *e.g.* Mulattos, the Mauri of Mauretania, Berbers of Arabic origin, Peulhs, Foulahs, descendants of the Fellahs of Egypt, Hottentots, Bushmen with Mongol blood, Danakils, Somalis and Gallas with Arab intermixture, and lastly, the Abyssinians who have come into contact with the Egyptians at periods of their history. Atrophic rhinitis was absent in all these races.

Negroes examined in Oceania and the Antilles Archipelago were also exempt. In Brazil, where the black element makes up three-quarters of the population, in Central America and the United States, cases were found both in subjects of pure race as well as Mulattos and Zambis (the result of the intermixture of negro and redskin). Dr. Chardwick, Rio Janiero, and Dr. Jones, Newport News, Virginia, colleagues of the author, have treated blacks affected with ozæna, and in their experience the disease is less frequent in Negroes and Mulattos than in the white and yellow races; in this the author concurs. The mucosa of the Negro is exceedingly resistant to infection. Races of yellow Asiatic blood are especially predisposed to atrophic rhinitis: the author observed it not only in Chinese and Japanese, but also in Indo-Chinese with Mongolian intermixture, in Esquimaux, Laps, Finlanders, Malays, Philippinos, Hovas, and Redskins. The author believes with Bosworth that ozæna is not preceded by hypertrophic rhinitis. He has made researches amongst the Chinese, both in their own country and living in a cold climate like Canada in winter, and has found that climatic conditions do not influence the frequency of the affection. Mongols in general have a great tendency to atrophic rhinitis of the anterior third of the inferior turbinated body, but unattended by symptoms; this is especially marked if they inhabit a warm country, and in a cold climate hypertrophic rhinitis is occasionally met with. American Indians are very prone to this form of atrophy. In any case the increased size of the inferior turbinated body does not appear to influence ozæna, the frequency of which varies directly with the contamination of the environment. Moreover African Negroes frequently suffer from hypertropic rhinitis if

subjected to a cold and moist climate, and in them atrophic rhinitis does not exist. The author was struck with the number of septal deflections in the yellow race, especially amongst the Indians, 40 per cent. of whom were affected. The mixed breeds are also more prone to this malformation than the whites. In Mongols compensatory hypertrophic rhinitis was scarcely ever present in the larger nasal fossa, but rather the presence of muco-purulent matter and crusts without fœtor were noticed. In this race true ozæna is not accompanied by the fœtor met with in whites and negroes, and this the author ascribes to physiological increase of the nasal secretions common to this type of man, which lessens the tendency to inspissation of discharges and acts in a salutary way against bacteria and other toxins. Deflection of the septum in Mongols, associated with the formation of non-ozænatous discharge in a large fossa, is an argument against Zaufal's theory, which ascribes the ozæna to undue patency of the nasal fossæ; besides, negroes of Africa, who possess extremely roomy fossæ, do not suffer from the disease. As to the theories of Siebenmann, Zarniko, Cholewa, and Grünwald the author does not insist on any dissent; he contents himself by again repeating that there is no atrophic rhinitis amongst the natives of the Dark Continent. The infectious theory of ozæna seems to the author to alone meet all exigencies. He believes the specific agent to be the *cocco-bacillus* of Perez (Buenos Aires). This bacillus introduced into the veins of an animal induces atrophic rhinitis with the characteristic fœtor. Other microbes in the nasal discharges only play a secondary rôle. After having examined a multitude of Indians in both Americas, belonging to twenty-seven separate tribes, the author found that the frequency of the disease varied with the surroundings. Rare on the higher plateaux, where the natives live sparsely in the open air, it was, on the contrary, much more common in the villages, where they live huddled together and breathe a contaminated atmosphere. In the latter 6 per cent. were affected, and the women leading an indoor life were more often affected than the men. The same facts were observed in Malaysia, China, and Japan. The redskins and mixed breeds are equally prone to ozæna; nevertheless the yellow race seems more predisposed to this disease than the white. The reason, the author thinks, is due, not only to uncleanness of certain branches of Mongols, but also to the asymmetry of their nasal fossæ—conditions which favour the production of a suitable soil for the culture of Perez' bacillus. The author arrives at the following conclusions: That ozæna is an infectious disease which is met with in all races. Nevertheless the incidence of affection is less in the case of the blacks than the whites, and falls with greatest frequency on the yellow races. The very large number of septal deviations in the latter, coupled with an almost constant state of uncleanness and nasal irritation, prepare these mucous membranes for microbic growth.

H. Clayton Fox.

ŒSOPHAGUS.

Lyon, B. B. V. (Philadelphia).—A Consideration of Cardiospasm, with Report of a Case. "*Amer. Journ. Med. Sci.*," March, 1916.

The commonest causes of cardiospasm are, in the first place, a functional condition constituting a local neurosis or a local manifestation of a general neurosis, the so-called primary cardiospasm, and, in the second place, primary œsophagitis. When cardiospasm and œsophagitis

are both present, it may be very difficult to decide which is primary and which secondary. Among other causes are congenital disposition, primary atony, and kinking at the hiatus œsophagi.

The first symptom is usually a sensation of dull aching pain behind the lower end of the sternum. As compensatory hypertrophy of the musculature of the lower portion of the œsophagus develops, in order to overcome the increasing obstruction, a second symptom appears, namely, regurgitation of food shortly after ingestion. Later, when the muscles yield to the strain, dilatation occurs, and the almost constant presence of decomposing food gives rise to secondary œsophagitis. A continual sense of burning pressure behind the sternum is complained of, and only small quantities of food can be taken at a time, so that there is a rapid loss of weight, and the patient may develop profound cachexia, and finally die of starvation.

The diagnosis is made by means of the X rays, the passage of bougies of the Plummer type in which the olive tip is threaded over a swallowed string, and by means of œsophageal lavage, the degree of dilatation being estimated from the amount of the injected fluid which can be recovered from the œsophagus. Lavage also gives important information as to the presence of œsophagitis, and the author describes in detail, with microphotographs, the œsophageal sediments obtained by the method already described by him in the September number of the same Journal.

In the treatment of the earlier cases, antispasmodics such as belladonna and atropin pushed to the limit of tolerance, together with general hygienic measures, may suffice. If they do not, dilatation by means of the instruments suggested by Plummer or Bassler may be required. Œsophagitis, when present, must be treated by lavage with germicidal solutions, such as potassium permanganate, silver nitrate, argyrol, etc., until the bacteria have disappeared from the inflammatory desquamation, when normal saline solution may be substituted. Autogenous vaccines also facilitate recovery. The intra-œsophageal use of the sinusoidal or faradic current may be required to overcome atony and dilatation. In very late cases, with extreme starvation, it is best to do a gastrostomy before proceeding to other treatment.

In advanced cases, particularly those with much œsophagitis, the treatment may need to extend over long periods; but, if properly dealt with, the patients eventually make good recoveries.

A full account is given of a severe case which was studied and successfully treated by the author.

Thomas Guthrie.

EAR.

Perkins, Chas. L.—The Chorda Tympani Nerve in Otolology. "The Laryngoscope," 1915, p. 341.

Perkins has collected the following cases: (1) During a radical mastoid operation there were repeated facial contractions due to irritation transmitted through the chorda. (2) Fraction on chorda at operation caused facial paralysis. (3) Facial paralysis just after operation—Was this due to division of nerve at tip or some lesion higher up? Perkins holds that the chorda is really an external branch of the facial. To test the sense of taste he uses (*a*) syrup (sweet), (*b*) 25 per cent. solution of tartaric acid (acid), (*c*) 25 per cent. solution of common salt (saline), and (*d*) saturated solution of quinine sulphate (bitter). The solutions are

applied with a cotton applicator. The patient is supplied with a chart showing the words sweet, sour, salty, bitter, and is directed to point to the sensation experienced. He must not speak, as this spreads the solution over other parts than the anterior two-thirds of the tongue. Between each test the mouth is washed out and the taste allowed to pass away. Children under ten years cannot be accurately tested.

Cases after the radical operation show complete loss of taste in the chorda area on the operated side, and in about one-third of the cases there was loss of taste on the posterior third of the tongue, soft palate, or fauces. This is supposed to be due to involvement of the tympanic plexus. In chronic suppurative otitis media, ageusia from involvement of the chorda is present in more than 50 per cent. In acute cases before paracentesis Perkins found perversion or loss of taste in 20 per cent. of cases. After myringotomy the cases showed no change. Perkins believes that the chorda is not severed during paracentesis.

In cases of nuclear facial paralysis taste is not affected, and there is no paresis of the scalp and forehead muscles, because the nerve supply to the latter is from the nucleus of the third. If the lesion is in the Fallopian canal, there is ageusia, even if the nerve be involved at the stylomastoid foramen. Pathological conditions peripheral to the above foramen give absence of ageusia. This group includes cases of so-called Bell's palsy, due to draughts, rheumatism, etc. All agree that the taste path for the anterior two-thirds of the tongue is through the chorda tympani and facial to the geniculate ganglion, but opinions differ as to its path from this point to the central connection. The most direct path from the geniculate ganglion would be by way of the pars intermedia of Wrisberg to the glosso-pharyngeal nucleus. Against this view are the following: (1) Facial paralysis from basal lesions without ageusia. (2) Lesions affecting the fifth nerve at or near the Gasserian ganglion are accompanied by chordal ageusia. (3 and 4) Experimental work on dogs and operative removal of Gasserian ganglion. (5) A patient with chordal ageusia was found, *post-mortem*, to have exostosis of Vidian canal and degeneration of great superficial petrosal. [The abstractor can add another proof. Case of facial paralysis due to neuritis in the internal meatus: There was *no* chordal ageusia on the affected side. The late Dr. Alexander Bruce wrote as follows: "The absence of middle-ear disease and the retention of the sense of taste, and the associated deafness, giddiness, and facial paralysis, indicated that the lesion was probably situated between the side of the pons and the bottom of the internal auditory meatus" (JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY, August, 1910).] The chordal taste fibres probably go from the geniculate ganglion through the great superficial petrosal and vidian nerves to Meckel's ganglion, and thence in the second division of the fifth to the brain, and perhaps a part also through the small superficial petrosal to the otic ganglion, and thence in the third division of the fifth. The work of Gowers, Horsley, and Ballance confirms this indirect path.

J. S. Fraser.

Beck, Joseph C.—X-ray Diagnosis in Otosclerosis. "Laryngoscope," 1915, p. 154.

Beck has examined twenty-seven cases of otosclerosis by the Röntgen rays—stereo-radiograms of both temporal bones being taken in each case. In addition he photographed normal cases, as well as cases of nerve deafness and of chronic catarrhal and suppurative otitis media. Beck finds that in marked progressive cases of otosclerosis the dark areas (in the

negative) in the region of the promontory are markedly enlarged. This indicates a deficiency in lime salts. In one case of active syphilitic labyrinthitis, Beck found a large area of rarefaction, probably due to syphilitic osteo-porosis. These areas of rarefaction were not found in the chronic catarrhal cases. Beck believes that otosclerosis is similar to the osteo-malacia found in other bones, and holds that it is due to a disturbance (hypo-action) of internal secretion, especially of the adrenals and pituitary. He treats his cases with adrenalin and pituitrin, and seems to be pleased with the result.

J. S. Fraser.

MISCELLANEOUS.

Bowman, Frederick B.—Ulcerο-membranous Stomatitis and Gingivitis among Troops: its Cause and Treatment. "Proceedings of Royal Society of Medicine, Medical Section," February, 1916, p. 113.

The author states that the number of cases of severe ulcerative conditions of the throat and month seen at Moore Barracks Pathological Laboratory would seem to warrant a report on their cause and treatment. He summarises his report in the following way:

A very severe form of communicable mouth and throat infection is common among the Canadian troops in England, and from reports is also widespread among the British troops in France.

Clinically, cases of this nature are diagnosed as syphilis, mercurial stomatitis, diphtheria, pyorrhœa alveolaris, etc., according to the form assumed. Apparently they are due to Vincent's organism (spirochæte and fusiform bacilli). Although amœbæ, streptococci, etc., are also found present, it is only when Vincent's organisms have disappeared that the condition undergoes cure.

When the gums are attacked the disease is more acute than ordinary pyorrhœa, and in some instances the gums and mouth appear much the same as in scurvy.

The throat condition sometimes cannot be diagnosed clinically from syphilis, and in all suspicious cases a Wassermann reaction should be done before a definite diagnosis is made or treatment is begun. The therapeutic test is valueless, as one full dose of salvarsan will usually clear up a badly ulcerated throat due to Vincent's organism.

The disease may be coincident with any other throat infection. It is sometimes chronic and may persist for months. A striking feature consists in the accompanying great depression and even vague constitutional disturbances which utterly unfit the man as a fighting unit.

The infection in the gums is very persistent, but may be ameliorated and is usually cured by the use of a simple prescription composed of arsenic and ipecacuanha solutions. The throat, even when deeply ulcerated, may be healed in a short time with the same solution.

Archer Ryland.

OBITUARY.

DR. JULES BROECKAERT.

THE premature death, in the forty-ninth year of his age, of Dr. Jules Broeckaert, of Ghent, in London on July 17, 1916, deprives Laryngology of one of its most industrious and enthusiastic scientific workers.

It was in 1895 that Dr. Broeckaert's name became known to laryngologists. His very first contribution to the literature of the specialty showed that a serious new-comer had arisen. He repeated Krause's experiments on the laryngeal cortical centres, and confirmed the fact that after their extirpation the laryngeal nerves and muscles remain intact ("Recherches expérimentales sur le centre cortical du larynx," *Revue de Laryngologie*, No. 15, August 1, 1895).

From this time onward his name appeared more and more frequently in the annals of laryngological and also of otological literature, and it is no exaggeration to say that between 1900 and 1914 very few laryngologists have contributed so many original papers to the treasury of specialist knowledge as the late Dr. Broeckaert. They altogether amount, Madame Broeckaert kindly informs me, to 115 contributions.

What always struck me most forcibly in his efforts was, first, the manifoldness of his interests, and secondly, the complete mastery over the methods of research by which he prosecuted his labours.

With regard to the first of these points it would be difficult to name a topic on which his facile pen had not enriched our knowledge. Everything in the domain of our specialty appeared equally familiar to him, and whenever he wrote about a rhinological, pharyngological, or laryngological subject or about phenomena linking our specialty to general medicine or surgery, one could be sure to find something original in his experiences and suggestions.

Concerning the technical equipment which he brought to bear on his studies, his command of every method of investigation was truly admirable—clinical, pathological, histological, microscopic, experimental lines of research seemed equally under his control, and, as he was additionally gifted with the power of clearly expressing his thoughts, it was always a pleasure to read his contributions, even when one did not see eye to eye with him.

From among the multitude of his scientific interests, however, Broeckaert returned time after time to two subjects, which had become particularly dear to his heart. These were: Injections of hard paraffin for correction of nasal deformities, and the question of the anatomy, physiology, and pathology of the laryngeal nerves.

Shortly after the introduction of the paraffin treatment he warmly took to it, and speedily became a fervid advocate of the hard paraffin method. He designed improvements in the manner of its application as well as safeguards against complications, and invented suitable instruments for the performance of the operation. As recently as 1913 he assured the Belgian Society of Surgery, on the basis of twelve years' experience, that these injections represented by far the best means of dealing with most forms of nasal deformities, and that their results were the more brilliant, since they were of a permanent character. His writings and demonstrations before various medical societies probably contributed more than anything else to popularise the method, and until the end of his days he was justly looked upon as a leading authority on this subject.

He was less happy with regard to his second pet-subject: the innervation of the larynx. If mere industry could have produced significant results, he surely would have achieved them. Ever since his repetition of Krause's cortical experiments he devoted himself with unflagging zeal to the study of this question in all its branches. In the years 1902 and 1903 he wrote, after numerous experimental and microscopic researches of his own, a paper on the normal and pathological anatomy and physiology of the recurrent laryngeal nerve ("Etude sur le nerf récurrent laryngé :

son anatomie et physiologie normales et pathologiques." *La Presse otolaryngologique Belge*, No. 11, 1902, and Nos. 1-5, 1903), in which he also studied the rôle of the sympathetic nerve in the innervation of the larynx. Six years later this enormously industrious study was followed by a monograph: "Les Paralysies Recurrentielles" (Bruxelles, Hayez, 1909), in which the author reported the literary results gained on that question during the past six years, together with renewed investigations of his own. It would not be proper for me on this occasion to enter at length upon the author's contentions. Suffice to say that, whilst quickly



DR. BROECKAERT.

forming and shortly afterwards relinquishing one hypothesis of his own after the other concerning the explanation of the median position of the vocal cord in incomplete paralysis of the recurrent laryngeal nerve, Broeckaert steadfastly adhered to the one conviction that—whatever might be the explanation of that position—Semon's view, viz., that the abductor fibres of the recurrent laryngeal nerve were more vulnerable in progressive organic lesions than the adductor-fibres, must be wrong. It was no use discussing the matter with him; his conviction had become a dogma, and he did not budge from it. All the same, one could never deny respect to so obviously honest a conviction, expressed, moreover,

always in strictly scientific language and free from all personalities. Our friendship, certainly, never suffered from this divergence of opinions.

Jules August Broeckaert was born at Ghent on April 7, 1867. He passed his final medical examination "*maxima cum laude*" on June 22, 1892, at the University of Ghent, and soon became one of the mainstays of the Belgian Oto-Rhino-Laryngological Society, before which he read many papers and gave demonstrations. At one time he was its President, and he was also a Vice-President of the Belgian Society of Surgeons. He was Editor of the special journal *Le Larynx*, and corresponding member of many foreign Laryngological Societies and Sections, amongst them the Laryngological Section of the London Royal Society of Medicine and the Laryngological Societies of France, Italy, Holland, Paris, and Berlin. On various occasions he acted as delegate of the Belgian Government at International Medical Congresses, which he used to attend very regularly, and at which he was repeatedly invited to introduce general discussions. He was also the Belgian delegate at the International Committee for the Organisation of the International Medical Congresses.

Shortly after the beginning of the German invasion of Belgium he took refuge with his family in London. There he acted first as physician at the War-Refugees' Camp at Earl's Court, and later at St. Anne's Home. He also was Professor at the Training College for Belgian Nurses.

In July, 1915, he went with his family to Holland but did not find a suitable opening there and returned to London early this year. His hope to attain a position in his own line was not realised, and he had to practise as a general practitioner and accoucheur amongst those of his own countrymen who had made London their abode. Although successful beyond his own hopes, the strain of working up lines of practice totally different from his own very seriously told upon him, and he bitterly complained to me of overwork when we lunched together only ten days before his untimely end. He had, at that time, made up his mind to settle, for the present, in Paris, where he hoped to find specialist work. Shortly after our meeting, however, his health began rapidly to fail; he could take no nourishment, and after a week's struggle went to bed early on July 16. Apoplexy with right-sided hemiplegia supervened the same day; he lost consciousness and died early next morning—as clearly as possible a victim of this terrible war!

Broeckaert's personality was charming; always an amiable smile on his face, always inclined to look at things from the bright side, always full of love for his wife and children, with whom everyone will most deeply sympathise. He has done good work for our specialty, and all who have known him will cherish his memory. *Felix Semon.*

THOMAS JAMES WALKER, M.D., F.R.C.S., J.P.

(Peterborough.)

MANY of our *confrères* both at home and abroad whose memories can carry them back to the early days of laryngology will learn with deep regret of the death of one of the pioneers of their art in the person of Dr. T. J. Walker of Peterborough.

Born in 1835, T. J. Walker was the son of a doctor, a Dumfriesshire man, who had settled in Peterborough. After a university career of much promise and brilliancy the younger Walker joined his father in

practice in 1860, and remained in Peterborough until the day of his death on July 19, 1916.

A general surgeon, or perhaps it would be more correct to say a general practitioner, Walker was nevertheless a man whose energy and wide interests bore him far beyond the usual limitations set, generally by themselves be it said, upon the general practitioners' professional activities. In laryngology his claim to distinction lies in the facts that he was one of the first men in England to remove a growth from the larynx through the mouth, the case being reported in the *Lancet* of November 9, 1861, and that he wrote a series of articles in the *British Medical Journal* as early as 1863, upon the Laryngoscope and its Clinical Application. So high was his esteem among British laryngologists that in the International Congress of Medicine in London in 1881 he was associated with Sir Felix Semon and Dr. de Havilland Hall as Secretary to the Sub-section of Diseases of the Throat. He also received the distinction of being appointed a Vice-President of the Laryngological Society of London.

Since those days, however, the engrossing claims upon his time and attention made by a large and increasing practice rather induced a slackening of his interest in the more modern developments of our specialty. But he never lost touch with it and in 1913, when he was invited to deliver the introductory address of the Session at the Central London Throat and Ear Hospital, it was felt that no one had a better right than he had to appear in that position as one of the historical figures of British laryngology.

On that occasion the old story was recalled and repeated of how Walker "wiped the eye" of a well-known London laryngologist who was unacquainted with Walker's prowess in laryngeal surgery. A patient of Walker's came to town to consult the London man about hoarseness. A laryngeal growth was discovered and the patient was returned to Walker with a note explaining the nature of the disease and the operation necessary for its cure, and appointing a certain day for him to attend to have the growth removed. The day arrived and with it the patient, but as he took his seat in the chair he brought out of his pocket a small bottle and handed it to the great man. In it was the growth, Walker having without any comment removed it himself to save the other the trouble.

Walker's interests and activities were extraordinarily diverse. In addition to extensive medical, public, political and Masonic works, he found time to cultivate archæology and to become an authority in that science. And his latest researches took him into the almost untouched corner of history that has to do with the French prisoners in England during the Revolutionary and Napoleonic Wars, the work done by him being embodied in a book on the subject published in 1913.

REVIEWS.

Roentgenographic Diagnosis of Dental Infection in Systemic Diseases. By SINCLAIR JOUSEY, A.M., M.D., Consulting Surgeon, St. Bartholomew's Clinic, New York. Pp. 70. Paul B. Hoeber & Co. Price \$1.50.

Had Dr. Jousey's description and arrangement been as clear as his pictures this would have been a notable book. As it is, however, it is a mere pamphlet only touching the fringe of a great subject.

The utility of this recent development of X-ray work is perhaps not yet sufficiently appreciated by oto-laryngologists, and this small book, albeit so sketchy and incomplete, may still be of some service to them as an introduction to an important subject.

Dan McKenzie.

Throat and Ear Troubles. By MACLEOD YEARSLEY, F.R.C.S., with 12 illustrations. London: Methuen & Co. Price 1s.

Good common sense is the leading note in this little book, one of Methuen's Health Series, edited by Mr. A. Bishop Harman.

After a brief and accurate description of the anatomy and physiology Mr. Yearsley devotes his attention to such matters as "the importance of nasal breathing," "enlarged tonsils," "the care of the voice," and "the prevention of deafness," finishing up with a well-worded caution against quacks and quackery.

An excellent example this of the popular health-book.

Dan McKenzie.

CORRESPONDENCE.

To the Editor of THE JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY.

SIR,—I am much indebted to Mr. Macleod Yearsley for his kind remarks about my paper, and for his interesting comments.

Although sceptical as to the relation between nasal obstruction (excepting due to adenoids and naso-pharyngeal tumours) and *chronic middle-ear deafness*, even when of the catarrhal type, I am most anxious to be convinced. Mr. Yearsley assumes the connection and proceeds to explain it. While I have the greatest respect for anything which emanates from him, I cannot help thinking that on this occasion he is rather putting the cart before the horse. Let him first prove that defective nasal drainage is a cause of chronic middle-ear deafness and then explain the relation.

If they really stand to each other in the position of cause and effect, all that would be required is the publication of a series of carefully-treated cases in which no other treatment than removal of nasal obstruction has been carried out, with their results.

I need not at present introduce the arguments which might be elaborated from such facts, as for instance the rare occurrence of deafness in cases of nasal polypus, etc.

I am, yours faithfully,

P. McBRIDE.

September 17th, 1916.

BOOKS RECEIVED.

Roentgenographic Diagnosis of Dental Infection in Systemic Diseases.
By Sinclair Fousey, A.M., M.D. New York: Paul B. Hoeber, 1916.

Transactions of the American Laryngological Association. 1915.

CASE OF CHRONIC MIDDLE-EAR SUPPURATION AND CHOLESTEATOMA COMBINED WITH OTITIS VASCULOSA (OTOSCLEROSIS) OF THE LABYRINTH CAPSULE. (Figs. 1 to 10 inclusive.)

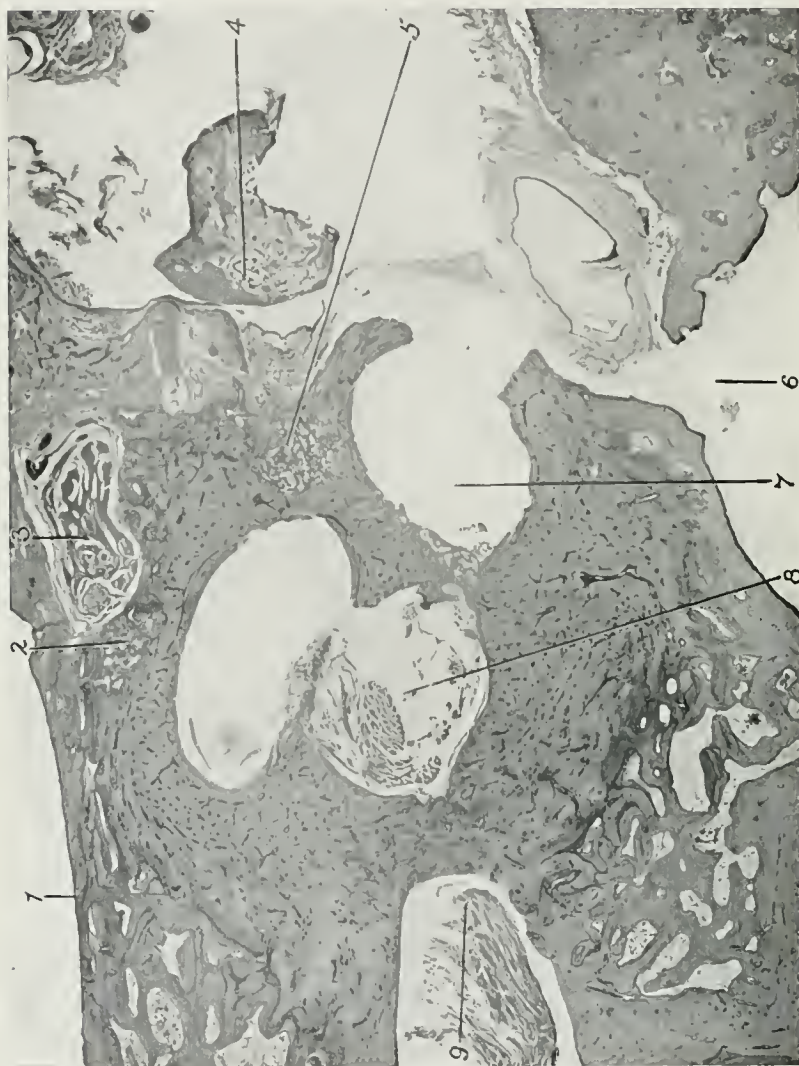


FIG. 1. Section 385 ($\times 8$ diam.).—Vertical transverse section through the region of the anterior margin of the oval window showing the area of spongification (5). The untidy condition of the section is explained in the text. 1. Floor of middle fossa. 2. Area of otitis vasculosa. 3. Facial nerve. 4. Ossicle (incus?). 5. Area of otitis vasculosa. 6. Jugular bulb. 7. Basal coil (the bony anterior margin of oval window (seat of election)). 8 and 9. Internal spinal lamina and membranous structures have been removed—artefact).

TO ILLUSTRATE MR. J. S. FRASER'S AND MR. R. MUIR'S ARTICLE ON THE PATHOLOGY OF OTOSCLEROSIS.

THE
JOURNAL OF LARYNGOLOGY,
RHINOLOGY AND OTOTOLOGY.

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**REPORTS FOR THE YEAR 1915 FROM THE EAR AND THROAT
DEPARTMENT OF THE ROYAL INFIRMARY, EDINBURGH.**

Under the care of A. LOGAN TURNER, M.D., F.R.C.S.E., F.R.S.E.

PART IV.

THE PATHOLOGY OF OTOSCLEROSIS.¹

BY J. S. FRASER,

Assistant Surgeon, Ear and Throat Department, Royal Infirmary, Edinburgh;

AND

R. MUIR,

Demonstrator of Pathological Methods, University of Edinburgh; Fellow of the
Pathological Society of Great Britain.

THIS communication consists of two parts: (I) In the first, one of us (J. S. F.) will briefly recapitulate the main theories in regard to the Pathology of Otosclerosis, and describe the results of the microscopic examination of the middle and inner ear from a case of "otitis vasculosa" associated with chronic middle-ear suppuration and cholesteatoma. (II) In the second part, one of us (R. M.) will give an account of the changes found in otosclerosis as they appear to a general pathologist.

PART I. (J. S. F.)

At the present time it appears to be impossible to state with confidence that the condition variously known as "otosclerosis,"

¹ The work was carried out in the laboratory of the Royal College of Physicians and in the Pathology Department of the University of Edinburgh.

"dry middle-ear catarrh," "spongification of the labyrinth capsule," "otitis vasculosa petrosa," "otitis stapedio-vestibularis," "petrous osteodystrophy," etc., is a pathological and clinical entity. It may be that the condition we know as "otosclerosis" is made up of two or more pathological conditions in somewhat the same way that "œdema" may result from affections of the heart, kidneys, nerves, or from inflammatory processes. All we know is that, apart from suppurative otitis media and adhesive processes in the tympanum, there are many cases of chronic progressive deafness (usually accompanied by tinnitus) in which functional examination of the auditory apparatus gives us the results we associate with a lesion of the sound-conducting mechanism—*i. e.* raised lower tone limit, lengthened bone-conduction, and negative Rinne test. Microscopic examination of such specimens as have been available have shown certain changes in the labyrinth capsule, especially in the anterior bony margin of the oval window. In the early stages of the disease we find here vascular spongy bone containing numerous spaces which show a central blood-vessel surrounded by some connective tissue. Osteoclasts are not found at this stage. Later on the diseased area becomes sclerosed by deposit of new bone in the walls of the spaces. The process usually extends to the stapedio-vestibular joint and results in bony fixation of the stapes. In the early stages the nerve structures are normal as a rule, but in the later there is usually a considerable degree of atrophy affecting Corti's organ, the stria vascularis, the spiral ganglion, and the cochlear nerve.

THEORIES AS TO THE PATHOLOGY OF OTOSCLEROSIS.

There appear to be only four possible ways in which the affection may arise: It may be congenital; it may follow inflammatory changes in the middle ear; it may be due to infection through the blood; it may be caused by abnormal conditions in the nerve supply of the parts affected.

(I) According to the first theory, otosclerosis is a congenital anomaly of the process of growth in the petrous temporal bone, due to the presence of certain determinants in the patient's blood. This anomaly only becomes manifest after puberty. Under normal conditions the growth of the membranous labyrinth and its bony capsule ceases soon after birth, though islands of cartilage may occur in the labyrinth capsule in the region of the anterior margin of the oval window (Figs. 19 and 20). According to the first theory growth continues in this cartilage bone and later spreads to



FIG. 2, Section 295 ($\times 8$ diam.).—Vertical transverse section through cochlea, showing three areas of otitis vasculosa (otosclerosis). 1, Middle fossa. 2, Area of otitis vasculosa. 3, Cholesteatoma. 4, Remnant of lymph space in capsule of cochlea. 5, Tubal part of tympanic cavity: the tympanic cavity in this case is divided into an upper part (lined by cholesteatoma) and a lower part communicating with the Eustachian tube. 6, Scala vestibuli of basal coil. 7, Two areas of otitis vasculosa. 8, Scala tympani of basal coil.

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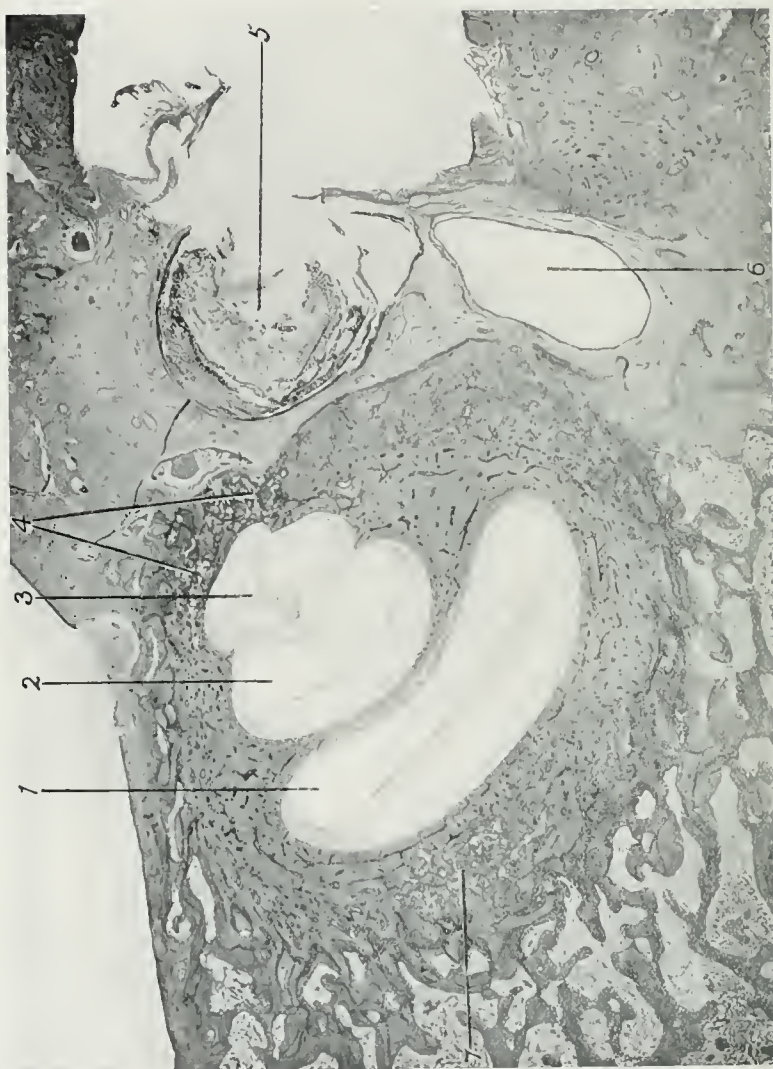


FIG. 3. Section 255 ($\times 8$ diam.).—Vertical transverse section through cochlea showing two areas of otitis vasculosa. At the apex of the cochlea the bony changes reach the endosteum. 1, Basal coil. 2, Middle coil. 3, Helicotrema. 4, Two small areas of otitis vasculosa. 5, Cholesteatoma. 6, Tubal part of tympanic cavity. 7, Area of otitis vasculosa.

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the footplate of the stapes, finally resulting in ankylosis. Those who hold this view lay great stress on the hereditary transmission of the disease, though they admit that the immediate cause of otosclerosis may be provided by puberty, by the puerperium, or disease of the tympanic mucosa. Further, Siebenmann, who supports this theory, points out the similarity of the changes seen in otosclerosis to those which occur in a rib in cases of empyema. (In such cases the process must surely invade the rib from the periosteum?)

(2) Otosclerosis is regarded by some as a chronic inflammatory process spreading from the mucoperiosteum of the middle ear and following attacks of catarrhal or suppurative otitis media. The inflammatory condition is supposed to linger about the niche of the oval window and to invade the bone from the deep layer of the mucosa. Such an invasion may be favoured by the anastomosis which occurs at this spot between the tympanic vessels and those of the bony labyrinth capsule. Further, as Walker and I have pointed out, the joints in the middle ear are the only articulations in the body covered by mucous membrane, and therefore liable to infection from the surface.

This view of the pathology of otosclerosis does not by any means exclude the hereditary transmission of a tendency to the disease. It may well be that in certain families the mucosa of the middle ear and the bony capsule of the labyrinth are congenitally weak, and therefore unable to resist infection from the surface. In the same way there seems to be evidence that in certain families cases of suppurative otitis media are specially liable to develop labyrinthine or intracranial complications. In cases of middle-ear suppuration several observers have noted changes in the bony capsule of the labyrinth similar to those seen in the early stages of otosclerosis—*i. e.* stage of *ostitis vasculosa* or spongification.

Against the theory that otosclerosis is an inflammatory condition following otitis media we must place the facts that—(a) in most cases the mucosa of the middle ear is normal (it is well known, however, that otitis media may pass off and leave little or no trace); (b) plasma cells are absent (I am not sufficiently skilled in pathology to deal with this point, but it has been stated that plasma cells are not invariably present in inflammatory conditions); (c) areas of osteoporosis are found in spots far distant from the mucosa of the middle ear (this will be dealt with later).

(3) A third group of otologists look on otosclerosis as a primary disease of the bone, the infection coming by way of the blood-

stream, as in osteomalacia, rheumatism, etc. Ferreri regards otosclerosis as closely allied to osteomalacia, and finds that almost all patients suffering from the latter disease are also the subjects of otosclerosis. A variant of this view is held by A. A. Gray, who has put forward the theory that otosclerosis is an aseptic necrosis of certain areas in the labyrinth capsule—apparently as a result of aseptic infarction. Gray believes that similar areas occur in other bones of the skeleton. It would certainly be of great interest to examine other bones, though it would not be so easy in them to identify areas of *ostitis vasculosa* as it is in the dense labyrinth capsule. A grave objection to the theory that otosclerosis is a puerperal infection is the fact that it is very common in young unmarried women, while the cases so commonly met with in men must, of course, be explained in another way. If, for a moment, we consider theories (2) and (3) together, we may compare them with those put forward regarding the connection between tonsillitis and rheumatism. Formerly it was held that attacks of tonsillitis were of “rheumatic origin”—*i. e.* that the tonsil was presumably infected through the blood-stream. More recently opinion has turned round, so that it is now held that rheumatism is of “tonsillar origin”—that is to say, that the blood-stream becomes infected from the tonsils. In my opinion the number of cases of otosclerosis which are looked on as *secondary* to otitis media is likely in the future to grow larger, while the number of the so-called *primary* cases is likely to decrease.

(4) Lastly, otosclerosis is regarded by a small group of observers as due to a trophic disturbance—*i. e.* as a degenerative atrophic process. According to this theory the changes (sometimes) found in the ganglia and nerves are primary, while those in the labyrinth capsule are secondary. In this connection it may be noted that certain cases, which clinically appeared to be examples of *nerve deafness*, on microscopic examination showed spongification of the labyrinth capsule with (Siebenmann) or without (Bruehl) ankylosis of the stapes. This type of otosclerosis associated with nerve deafness—the so-called “atypical otosclerosis”—is markedly hereditary. Again spongification of the bone in front of the oval window has been observed in an old woman aged eighty-two (Wolff), and in two other cases in old people (Mayer). On the other hand, advanced cases of otosclerosis have been microscopically examined, in which no degenerative changes were found in the nerve structures.



FIG. 4. Section 195 ($\times 8$ diam).—Vertical transverse section through cochlea showing three areas of otitis vasculosa in the cochlear capsule. 1, Areas of otosclerosis. 2, Tensor tympani. 3, Cholesteatoma. 4, External meatus. 5, Tympanic membrane. 6, Lower part of tympanic cavity. 7, Apical coil of cochlea. 8, Basal coil of cochlea. 9, Area of otitis vasculosa.

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FIG. 5. Section 135 ($\times 8$ diam) — Vertical transverse section through capsule of cochlea showing a large area of otitis vasculosa in front of the hollow spaces of the cochlea. 1, Middle fossa. 2, Large area of otitis vasculosa. 3, Tensor tympani. 4, Anterior bony wall of external meatus. 5, Tubal part of the tympanic cavity. 6, Fatty marrow. 7, Normal cartilage. 8, Normal cartilage bone (interglobular bone) of cochlear capsule. The section is made anterior to the hollow spaces of the cochlea, and only shows the cochlear capsule.

TO ILLUSTRATE MR. J. S. FRASER'S AND MR. R. MUIR'S ARTICLE ON THE PATHOLOGY OF OTOSCLEROSIS.

NATURE OF THE CHANGES IN THE BONE IN OTOSCLEROSIS.

According to Siebenmann the changes are as follows: (1) Vascular and fibrous marrow penetrates the normal Haversian canals and dilates them. (2) Next there is lacunar resorption by giant cells of the cartilage bone of the labyrinth capsule, resulting in the formation of large spaces containing blood-vessels and numerous cells. (3) New deeply staining bone is deposited in the walls of these large spaces (the bone takes on the basic hæmatoxylin stain). (4) The new bone becomes dense and gradually loses its affinity for the basic stain.

Manasse describes the changes thus: (1) Granulation and osteoid tissue are formed in the pre-existing spaces in the bone. This is the primary active process. The original bone of the labyrinth capsule disappears without absorption by giant cells. (2) The spongy new bone is destroyed by canaliculisation and lacunar resorption by osteoclasts; new marrow spaces are thus produced. (3) Bone is again formed by osteoblasts in the new marrow spaces; this bone becomes more and more compact by diminution in size of the marrow spaces. In this way new lamellar systems are formed, but the new compact bone is sharply marked off from the normal bone of the labyrinth capsule.

All writers on the pathology of otosclerosis take it for granted that the more deeply staining bone seen in the walls of the vascular spaces in the early stage of the disease is new-formed bone. In my experience, however, new-formed bone is usually pale and stains well with eosin, but not with basic stains. Such new bone may be seen in the walls of the mastoid air cells from cases of subacute mastoiditis. Accordingly, it seems probable that the bone which stains deeply with hæmalum or hæmatoxylin is not new bone at all, but merely the old bone of the region, the staining reaction of which has been altered by the change it has undergone owing to the vascular dilatation and the consequent increased supply of lymph. If we grant that in the stage of osteoporosis some irritant, inflammatory, or toxic condition be present, it will be obvious that in order to combat this condition the part needs an increased blood supply. The vessels of the Haversian spaces therefore dilate, the marrow proliferates, and the spaces become enlarged. It is not necessary that the bone should be removed by osteoclasts. Bone yields before long-continued pressure exerted by structures much softer than itself—*e. g.* the enlarged mastoid antrum and tympanic attic in cases of cholesteatoma, in the walls

of which I have never observed osteoclasts. Later on, when the local chronic inflammatory or toxic process has been overcome, the vascular supply diminishes and the bone again becomes sclerotic and loses its affinity for basic stains.

In support of the second (2) view as to the pathology of otosclerosis—namely, that it is a chronic inflammatory process invading the labyrinth capsule from the deep layer of the mucosa in the region of the anterior margin of the oval window—I bring forward the following case, the clinical notes of which are, unfortunately, very meagre:

J. H.—, male, aged nineteen, had suffered from chronic middle-ear suppuration of unknown origin for many years. The patient was a foundling, and nothing is known as to his parentage; he was a very dull boy and backward in every way, according to the account of his guardian. He was in and out of the poorhouse on several occasions, before his last admission on May 11, 1911. Death occurred on May 15, and at the autopsy a large temporo-sphenoidal abscess was discovered. As the patient had not been seen by an otologist, and as no functional examination had been carried out, it was not at first thought to be worth while to examine the ear microscopically. A vertical saw-cut was therefore made through the temporal bone from the external to the internal meatus in order to demonstrate cholesteatoma in the tympanic cavity and attic. As the specimen did not show this very well, it was determined to examine the ear microscopically in order to observe the condition of the labyrinth (cholesteatoma deafness?). In view of the fact that the labyrinth capsule showed extensive areas of *ostitis vasculosa*, it may readily be imagined that I was not too pleased with myself for having destroyed with the saw the regions of the oval and round windows. It is further unlucky that the plane of the saw-cut is not a favourable one for microscopic examination of the labyrinth. The results of the examination may be summarised as follows: The Eustachian tube shows normal epithelium, but the submucous tissue is thickened and shows cystic spaces (Fig. 4). The tympanic cavity, aditus and antrum are lined by cholesteatoma (Figs. 3 and 6). The bony walls of the attic and antrum show large spaces containing connective tissue and blood-vessels, but no giant cells (*ostitis vasculosa*?) (Fig. 6). On the inner wall of the tympanum, in the anterior margin of the oval window, there is an area of *ostitis vasculosa* in the labyrinth capsule (Fig. 1). If we start at this point we can trace the spread of the disease in the wall of the labyrinth between the periosteal and cartilage bone round to the region of the internal auditory meatus, and also over the apex of the cochlea to the anterior part of the bony capsule of this structure (Figs. 2 to 5). At the apical coil of the cochlea the spongification reaches the perilymph space (Fig. 3). Further back on the inner wall of the aditus and antrum, in the region where the vessels of the fossa subarcuata begin, the bone shows large spaces containing blood-vessels and connective tissue (Fig. 6). The marrow surrounding the labyrinth capsule appears at all parts to be very fibrous (Figs. 3 and 4). Beyond this the marrow is fatty, but cellular marrow is entirely absent.

In the case of specimens obtained from the human subject it is never wise to be dogmatic in regard to changes in the delicate nerve structures of the labyrinth, even in cases (such as the present) where the temporal bone was obtained within twenty-four hours of death and at once placed in fixative. With this proviso it may be stated that Corti's organ appears to be atrophied in all coils; only the out-

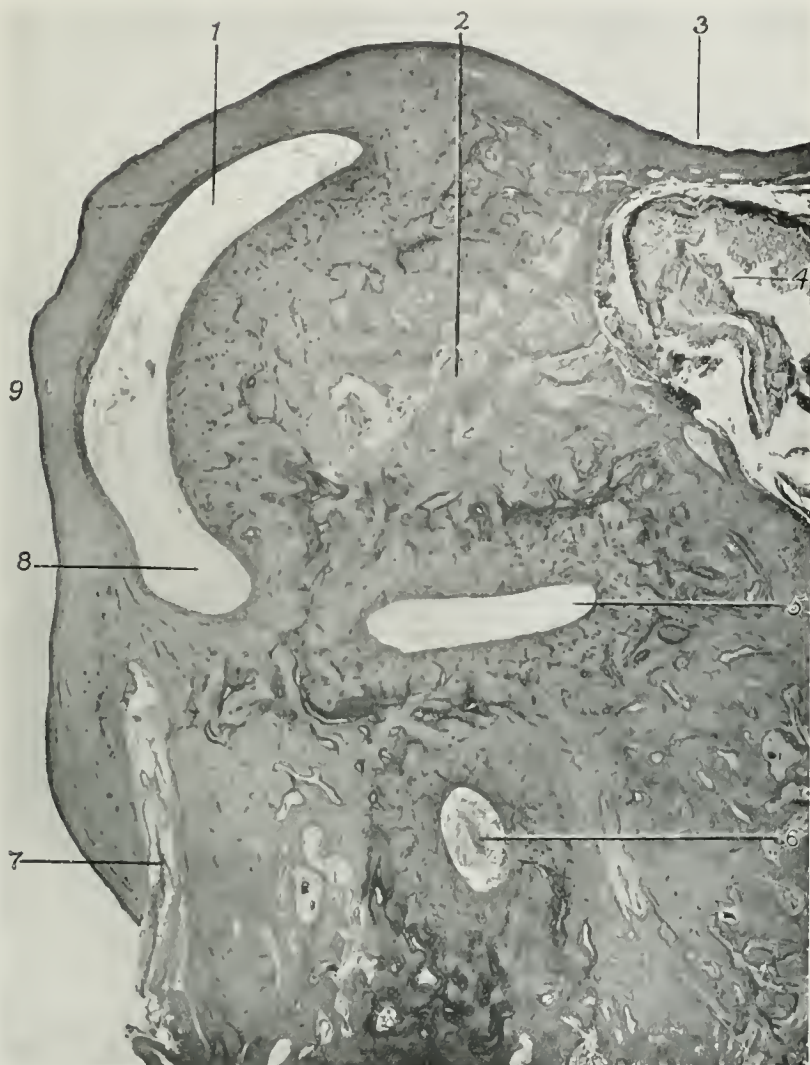


FIG. 6, Section 445 ($\times 8$ diam.).—Vertical section through the posterior part of the labyrinth in the region of the semicircular canal. 1, Superior canal. 2, Area of otitis vasculosa? passing in towards fossa subarcuata. 3, Floor of middle fossa. 4, Cholesteatoma in antrum. 5, External canal. 6, Posterior canal towards the ampullary end. The canal here contains bone dust (artefact). 7, Saccus endolymphaticus. 8, Crus commune. 9, Posterior cranial fossa. Note change in the bone (otitis vasculosa) passing inwards from the cholesteatoma matrix on inner wall of antrum. In this situation the veins from the inner wall of the antrum pass through the fossa subarcuata to the posterior cranial fossa to join the inferior petrosal sinus. The condition seen in the photomicrograph is, however, not found under normal conditions.

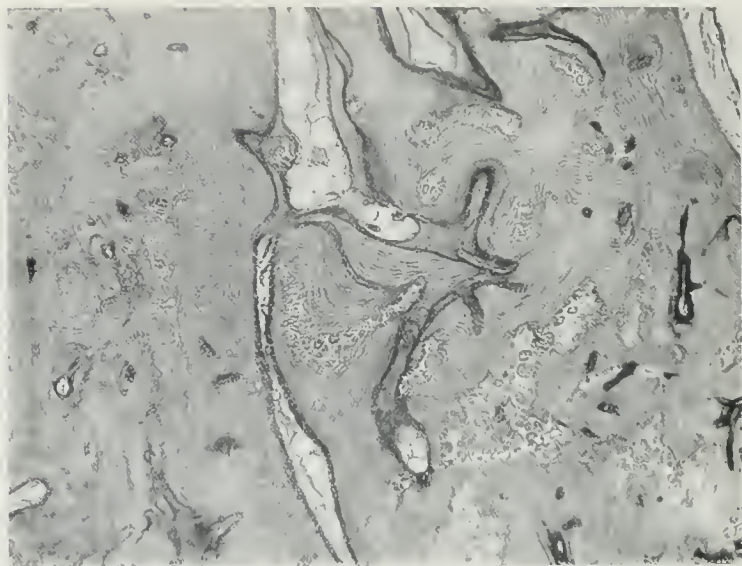


FIG. 7.—Showing lymph or marrow space in the labyrinth capsule, between the cartilage bone (right) and the lamellar bone (left) (a probable path of infection). $\times 60$ diam.

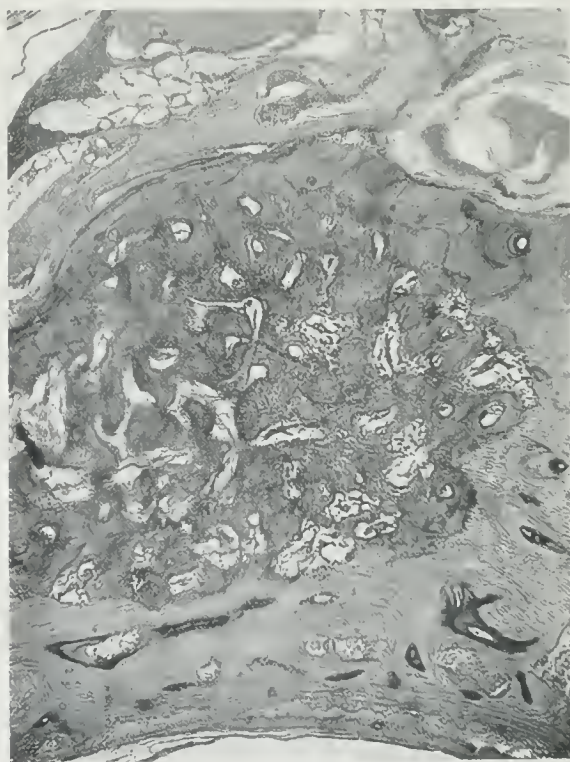


FIG. 8.—Showing area of spongification in the cochlear capsule. This area is sharply defined and lies between the cartilage bone (below and to the right) and the lamellar bone (above and to the left). $\times 60$ diam.

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line of this structure is visible. The cells of the spiral ganglion also appear to be shrunk, and their place is taken by connective tissue. The vestibule, along with the ampullary ends of the canals, were destroyed by the saw-cut.

I have found changes, somewhat similar to those seen in the labyrinth capsule of this case, in the malleus and incus obtained from cases of chronic middle-ear suppuration in which the ossicles were diseased (Figs. 12 and 14).

In order to explain how the chronic infective condition, which invades the labyrinth capsule from the region of the promontory, can reach the internal auditory meatus it is necessary to recall a few facts regarding the development of the ear. About the third month of foetal life we find the otic vesicle, now differentiated into cochlea, saccule, utricle, and canals, surrounded by a capsule of cartilage of mesoblastic origin (Fig. 15). At this stage the perilymph space is still filled with foetal connective tissue. Further, the hollow bud of mucosa from the naso-pharynx which lines the Eustachian tube, and is later on to line the tympanum, aditus, antrum, and mastoid cells, has as yet only reached the anterior and lower part of the tympanic cavity. Later on, the cartilage capsule of the inner ear mentioned above becomes converted into dense, non-vascular bone (Fig. 19). This bone throughout life contains numerous spaces (interglobular spaces) which hold cartilage cells even in old people.

In the child and adult the membranous labyrinth is surrounded by three distinct layers of bone (Fig. 20): (1) Just outside the endosteum, which lines the labyrinth, there is a very dense layer of compact bone formed by the outer (osteogenic) surface of the endosteum (Fig. 21, No. 6); this layer is, later on, intimately fused with (2) the dense bone derived from the cartilaginous capsule of the labyrinth referred to above (Fig. 21, No. 7); (3) surrounding this cartilage bone, but distinct from it, we have the lamellar bone with its cellular, fatty, or fibrous marrow (Fig. 21, No. 3). This lamellar bone, where it lies next to the middle ear, is formed by the deep layer of the tympanic mucosa and, where it lies next to the cavity of the skull, by the osteogenic layer of the dura mater (Figs. 17, 18 and 19).

Although I have not noticed it in the communications of other observers I have found that, in the foetus, there is a well-marked space—probably a lymph or marrow space—between (2) the cartilage bone and (3) the lamellar bone (Fig. 17, Nos. 8 and 9). In young children this space is, as a rule, clearly visible though not continuous, but in later life it is not so well seen, though traces of it may still be found, especially in the capsule of the cochlea. In

any case a "potential" space is always present, just as between two pieces of wood which have been glued together.

It is my belief that a chronic infective process, such as a pyogenic osteomyelitis, a syphilitic or tubercular osteomyelitis, or the condition known as otitis vasculosa, may invade the mucoperiosteum of the inner tympanic wall, infect the marrow spaces of the lamellar bone, and finally invade the lymph or marrow space described above. When once this has been opened up the chronic infective process may spread round the cochlea between the lamellar and cartilage bone, and even progress as far as the internal auditory meatus. This theory meets the objection raised by Politzer—that otosclerosis cannot be secondary to an infection of the tympanic mucosa, because the otosclerotic change has been found in the region of the internal meatus, where there is no mucous membrane connected with the middle-ear spaces.

THE CAUSE OF DEAFNESS IN OTOSCLEROSIS.

(1) *Ankylosis of the Stapes*.—In the cases in which ankylosis is present it is obvious that the cause of deafness is not far to seek. This has led Jenkins and Bárány, independently of one another, in recent times, to expose the endosteum of the labyrinth in the region of the external and posterior canals respectively, *i. e.* to make what has been called by some a "labyrinth fistula." As a matter of fact these otologists did not make a fistula at all, as this would have necessitated opening the lymphatic spaces of the labyrinth. What they did was to provide an artificial window to replace the ankylosed oval one on the assumption that the membrane of the round window was still mobile, and that, the labyrinthine fluid being incompressible, it was necessary to have two movable windows in order to enable vibrations to occur in the labyrinthine fluid. In the cases recorded by both the otologists mentioned above the immediate effect of the operative procedures was extremely gratifying, but within a comparatively short time the hearing again deteriorated. It must be admitted that there are cases of otosclerosis on record in which marked deafness was present, although microscopic examination showed that the stapes was not ankylosed.

(2) *Changes in the Labyrinthine Fluid*, especially in cases in which the bone disease reaches the endosteum of the labyrinth. Jenkins lays great stress on the probability of a change occurring in the composition of the labyrinthine fluid in cases of otosclerosis,

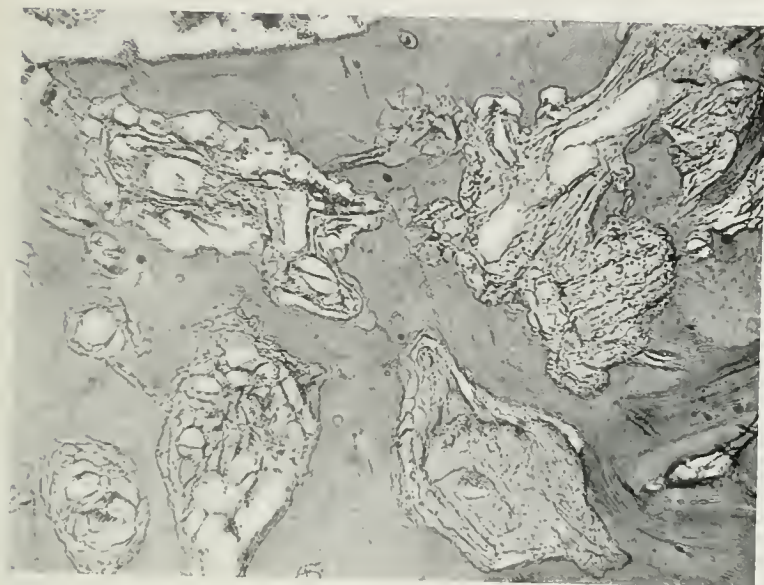


FIG. 10.—Showing spongification of bone in the wall of mastoid antrum. $\times 60$ diam.

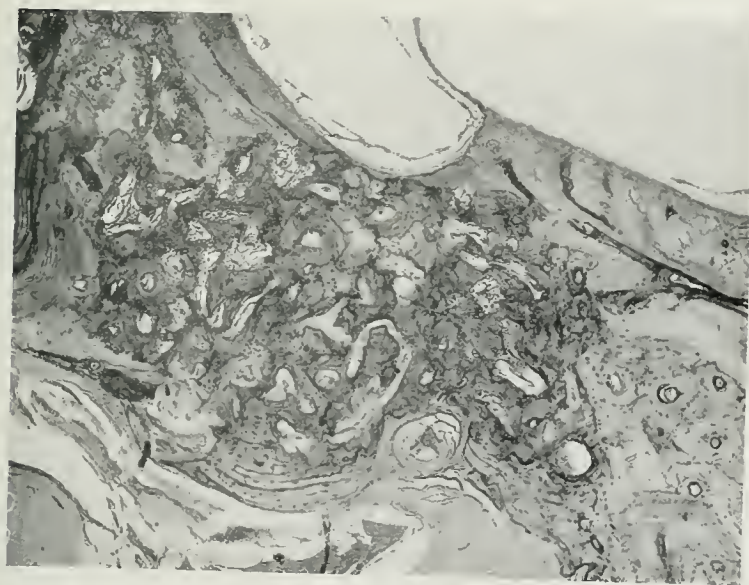


FIG. 9.—Showing area of spongification of apical coil. Both the lamellar and cartilage bones are involved, the change extends completely through these layers, and at one point reaches to the endosteum of the apical coil. $\times 60$ diam.

TO ILLUSTRATE MR. J. S. FRASER'S AND MR. R. MUIR'S ARTICLE ON THE PATHOLOGY OF OTOSCLEROSIS.

NORMAL AND DISEASED OSSICLES FROM CASES OF CHRONIC MIDDLE-EAR SUPPURATION. (Figs 11 to 14 inclusive.)

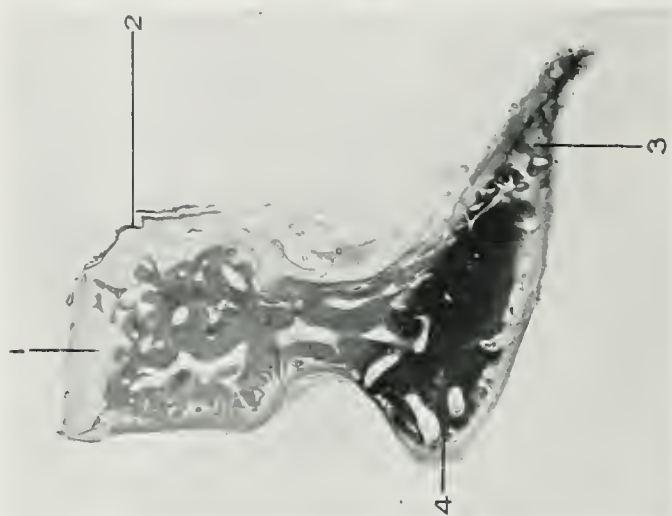


FIG. 12.—Eroded malleus from a case of chronic middle-ear suppuration and cholesteatoma. $\times 15$ diam. 1, Eroded head of malleus. 2, Cholesteatoma. 3, Handle of malleus. 4, Short process.



FIG. 11.—Vertical transverse section of normal malleus. $\times 15$ diam. 1, Head of malleus. 2, Articular surface. 3, Handle. 4, Short process.

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and holds that this may account not only for the deafness, but also for the paraeusis.

(3) *Degeneration of the Cochlear Ganglion, Nerve, and Corti's Organ.*—The microscopic examination of the inner ear involves such a long and complicated process that in the case of the human ears it is never safe to be dogmatic in regard to the finer changes which may appear to be present in the cells of the spiral ganglion, in the fibres of the cochlear nerve, or in the sensory and supporting cells of Corti's organ, even in those instances in which the temporal bone is obtained within twenty-four hours of death and immediately placed in a suitable fixative solution after the hollow spaces of the labyrinth have been opened. In animals the fixative (Zenker's solution) can be perfused through the vessels before death, or the temporal bones can be at once removed and placed in the warm solution, so that we are able to speak with confidence regarding the finer changes in the nerve structures. In examining human ears, however, we must be very sceptical in attributing importance to slight changes in the nerve structures, such as shrinking of the ganglion cells, fibrillation of the nerves, or slight flattening of the acoustic papilla. In some cases of otosclerosis, in which deafness was present during life, microscopic examination of the inner ear has shown that the nerve structures were well preserved. Here we may conclude with a fair degree of certainty that the cause of the deafness was not degeneration of the sound-perceiving apparatus. Such cases have been recorded by several writers. It is usually held that the nerve changes in otosclerosis are secondary to the bony changes, and that they are probably due to a toxin. If this is so the condition would be analogous to that observed by D. Orr and others in the spinal cord and nerves in relation to toxic processes in the bladder, kidneys, etc.

(4) *Spongification of the Labyrinth Capsule.*—Under normal conditions the sensitive structures of the membranous labyrinth are surrounded by two layers of dense non-vascular bone, the endosteal and cartilage bone referred to above. It is not easy to understand how the cartilage bone receives its nourishment, but, as it is not an active structure, it probably requires little, and this can be obtained from the lymph which finds its way into the interglobular spaces with which the bone is so plentifully supplied. The complicated course of the vertebral arterics and the arrangement of the circulation at the base of the brain seem especially suitable to provide an even flow of blood to the delicate structures at the inner ear. Politzer maintains that an anastomosis occurs

between the labyrinthine vessels and those of the middle ear in the neighbourhood of the oval window. In otosclerosis, on the other hand, the character of the bone forming the labyrinth capsule is altered and vascular spongy bone replaces the dense non-vascular bone over more or less considerable areas. If, as most authorities hold, it is necessary for perfect hearing that the membranous labyrinth should be surrounded by dense non-vascular bone, it is easy to understand that in otosclerosis the hearing power is greatly diminished. The writer is of opinion that this last theory (4) probably provides the true explanation of the deafness in typical cases of otosclerosis. As the patients say themselves, they could hear well enough if it were not for "the noises." In atypical cases of the disease in which the nerve structures are degenerated the deafness can be accounted for by the lesion of the sound-perceiving apparatus.

THE CAUSATION OF TINNITUS.

Much of what has already been said with regard to the causation of deafness applies also to tinnitus. *Vascular changes*: The increase in the vascular anastomosis between the vessels of the internal and middle ear may to some extent explain the noises from which the patient suffers—noises which are worse when the patient lies down at night. Again, the presence of vascular spongy bone in the cochlear capsule is likely to result in tinnitus. *Nerve changes*: Degeneration of the nerve structures has been put forward, especially by Neumann, as one cause of noises in the ear. This change Neumann calls "neuronophagia." If the cells of the cochlear ganglion merely atrophy, there is no tinnitus; but if, in the process of degeneration, there is a preliminary stage of irritation, tinnitus will arise. *Labyrinthine fluids*: It is not so easy to account for tinnitus by a change in the labyrinthine fluid, though it is possible that such a change might affect the nerve structures or might favour the conduction of vascular noises. It is interesting in this connection to remember that in cases of chronic progressive middle-ear deafness an intercurrent attack of acute otitis media may greatly improve the hearing. The writer once knew an otologist who was so impressed by this fact that he proposed to treat such cases by infecting the tympanic cavity with pyogenic organisms!

PARACUSIS.

In the writer's experience paracusis is not by any means present in all cases of otosclerosis.

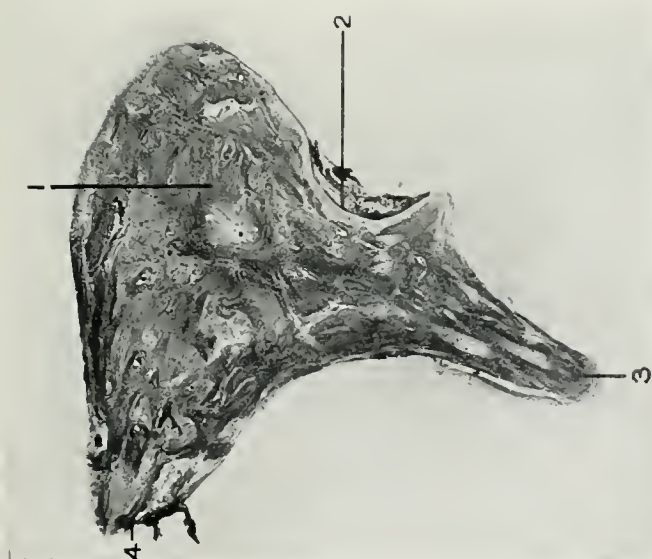


FIG. 13.—Vertical transverse section of normal incus. $\times 15$ diam. 1, Body of incus. 2, Articular surface (with blood clot). 3, Long process. 4, Short process.

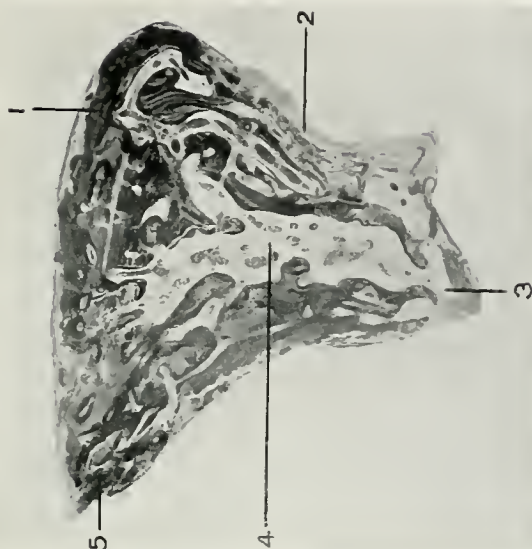


FIG. 14.—Eroded incus from a case of chronic middle ear suppuration. $\times 15$ diam. 1, Body of incus. 2, Articular surface. 3, Eroded long process. 4, Invasion of the marrow spaces by a chronic form of osteomyelitis analogous to that seen in the labyrinth capsule in otosclerosis and congenital syphilitic deafness. 5, Short process of incus. Note large marrow space with dilated vessels extending from region of eroded long process.

DEVELOPMENT OF THE LABYRINTH CAPSULE STUDIED IN RELATION TO THE PATHOLOGY OF OTOSCLEROSIS. (Figs. 15 to 21 inclusive.)

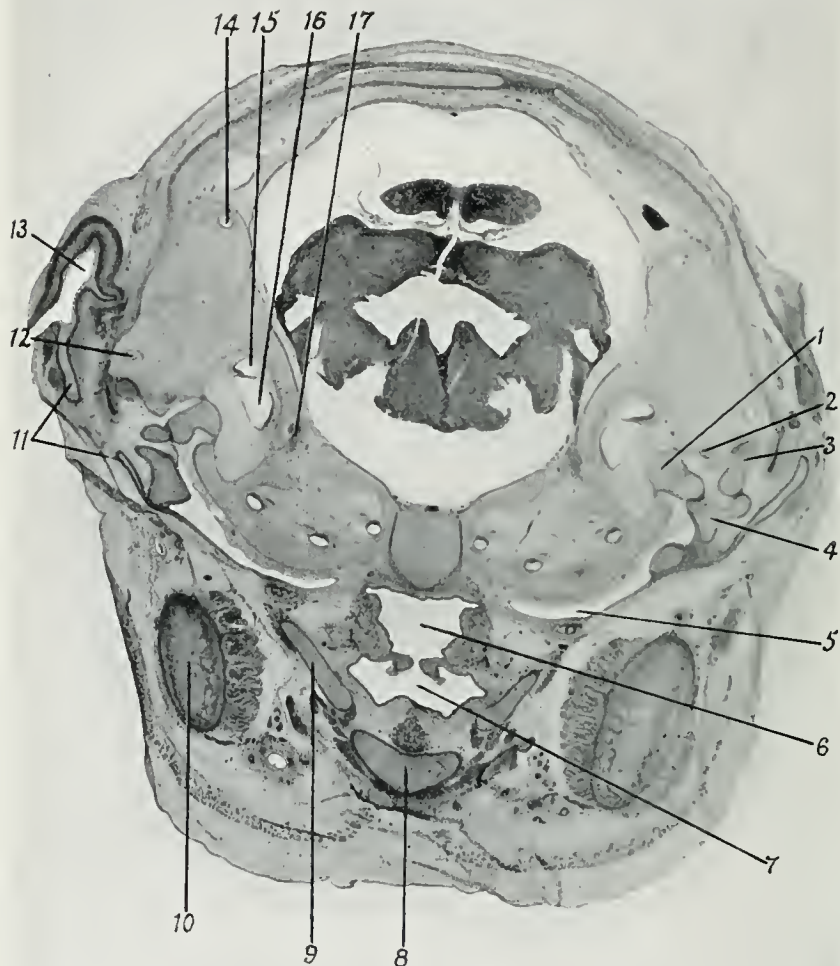


FIG. 15.—Vertical transverse section through head of fetal pig ($\times 8$ diam.), showing the fetal cartilaginous capsule of the labyrinth on both sides. The endolymph spaces are patent, but the perilymph spaces are still filled with fetal connective tissue. 1, Footplate of stapes. 2, Facial nerve. 3, Incus. 4, Malleus. 5, Eustachian tube. 6, Naso-pharynx. 7, Mouth cavity. 8, Hyoid. 9, Meckel's cartilage. 10, Lower jaw. 11, External auditory meatus. 12, External canal. 13, Hollow of auricle. 14, Superior canal. 15, Utricle. 16, Sacculle. 17, Cochlear nerve. Note the cartilage capsule of the labyrinth extending from above 14 to the basisphenoid which lies above 6.

(a) Some writers have supposed that *stimulation by noise is necessary to excite the atrophied nerve apparatus*. It has been suggested that in the early stages, before ankylosis occurs, the reflex effect of external noise (acting through the stapedius muscle) alters the tension of the labyrinthine fluid so as to put it into the best condition for the perception of sound. According to this view, one would expect that paracusis would be present in the early stages of the disease, but would pass off later on. The writer has met with several cases in which this history was obtained. Urbantschitsch holds that paracusis is due to a raised functional capacity of the acoustic nerve apparatus.

(b) It is well known that Politzer was of opinion that paracusis could be explained by the massage effect of the external noise or vibration on the more or less stiffened joints between the ossicles. If cases of chronic adhesive process in the middle ear alone presented the symptom of paracusis it might be possible to agree with this theory, but paracusis is a much more prominent symptom in otosclerosis than in the so-called chronic middle-ear catarrh (chronic adhesive process). Further, if Politzer's theory were correct, one would expect that the improvement in hearing would continue for some time after the external vibrations had ceased. As far as I know, this is not the case.

(c) Paracusis has been attributed by Jenkins to a change in the labyrinthine fluid. It appears to the writer that the composition of the labyrinthine fluid, at least of the perilymph, must closely correspond with that of the cerebro-spinal fluid. It might be possible to settle this point by chemical examination of the cerebro-spinal fluid from cases of otosclerosis. Babinski has reported numerous cases in which tinnitus was markedly improved by lumbar puncture.

(d) The view has been put forward, by Jenkins and others, that the paracusis is more apparent than real, *i. e.* that the patients do not really hear better in a noise, but are able to catch the raised voice of their companion in noisy surroundings such as those of a railway carriage because they are less disturbed than normal people by those noisy surroundings. It is, of course, widely known that low tones are badly, or not at all, heard by patients suffering from otosclerosis, and according to this theory (d) it is assumed that the external sounds which so much disturb normal people are of low pitch, and consequently more or less inaudible to otosclerotics. It certainly appears to be true from

the writer's experience that married women suffering from otosclerosis are better able to hear the high-pitched voices of their children than the deeper tones of their husbands. It should not be a difficult matter to test this last theory of paracusis, for if it were true an otosclerotic should not hear any better in noisy surroundings if the noise were of high pitch. It must, of course, not be forgotten that in noisy surroundings people naturally raise their voices to a considerable extent.

(e) McBean (*Annals of Otology*, December, 1915) advances what appears to be a new theory to explain paracusis. The points in McBean's argument appear to be as follows: (1) The nerve endings in the cochlear and vestibular apparatus are very similar. The tectorial membrane and Corti's organ in the cochlea correspond to the cupula and crista in the canals. (2) Movements of the fluid are constantly occurring in the canals, and keep the end organs of the vestibular apparatus in a suitable condition for appreciating passive movement and rotation. (3) Under normal conditions the ossicular chain and the column of perilymph in the scala vestibuli and scala tympani move backward and forward with each sound vibration, the round window membrane bulging out when the stapedial foot-plate moves inwards. (4) Sound vibrations—especially those of low tone—are practically always present, so that the normal relation of the tectorial membrane to Corti's organ must be that of constant simultaneous motion. These movements keep the nerve terminals in an efficient state. (5) When the stapido-vestibular joint is ankylosed the sound-conducting mechanism is thrown out of gear, low tones are not transmitted, and movements of the fluid in the cochlea are interfered with. (6) The membrane of the round window is capable of performing excursions five times greater than those of the foot-plate of the stapes. In the normal ear the round window membrane plays a passive rôle, but, when the stapedial foot-plate is more or less fixed, the membrane of the round window takes on a more active function. A greater stimulus, however, is needed, and is provided by the vibrations of machinery or a rail-road train. Under such conditions the membrane of the round window and the cochlear lymph move to and fro with something like their normal motion, and at the same time the hair cells attached to the tectorial membrane can resume their function as receivers of sound. (7) If the above theory is accurate, McBean would expect that in those cases of otosclerosis in which the round window is obliterated by new bone formation, paracusis would not be present.

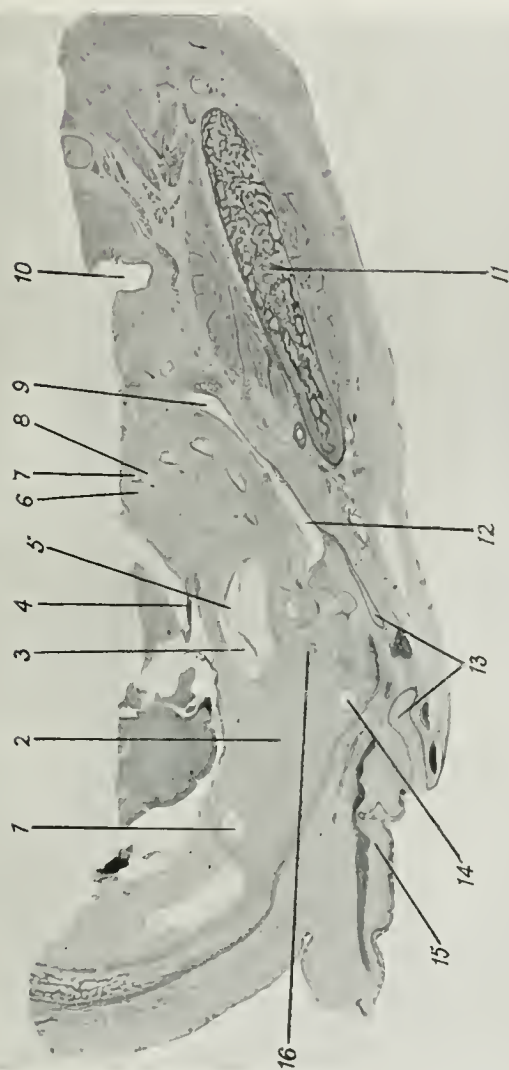


FIG. 16, Vertical transverse section ($\times 8$ diam.) through head of fetal pig at later stage than preceding photomicrograph (No. 15). The section corresponds to the left half of Fig. 7, but lies horizontally instead of vertically. The perilymph spaces of the vestibule and canals are now patent, but in the cochlea the perilymph space is still filled by fetal connective tissue. 1, Superior canal. 2, Vessels of fossa subarcuata. 3, Utricle. 4, Cochlear nerve. 5, Sacculus. 6, Scala tympani still solid. 7, Cochlear canal. 8, Scala vestibuli still solid. 9, Eustachian tube. 10, Mouth cavity. 11, Lower jaw. 12, Tympanic cavity only reaches malleus and anterior margin of oval window. 13, External auditory meatus. 14, External semicircular canal. 15, Auricle. 16, Facial nerve. The posterior and upper parts of the tympanic cavity are still filled with fetal connective tissue. The perilymph space of the vestibule and canals is now patent, though that of the cochlea is still filled with fetal connective tissue.

TO ILLUSTRATE MR. J. S. FRASER'S AND MR. R. MUIR'S ARTICLE ON THE PATHOLOGY OF OTOSCLEROSIS.

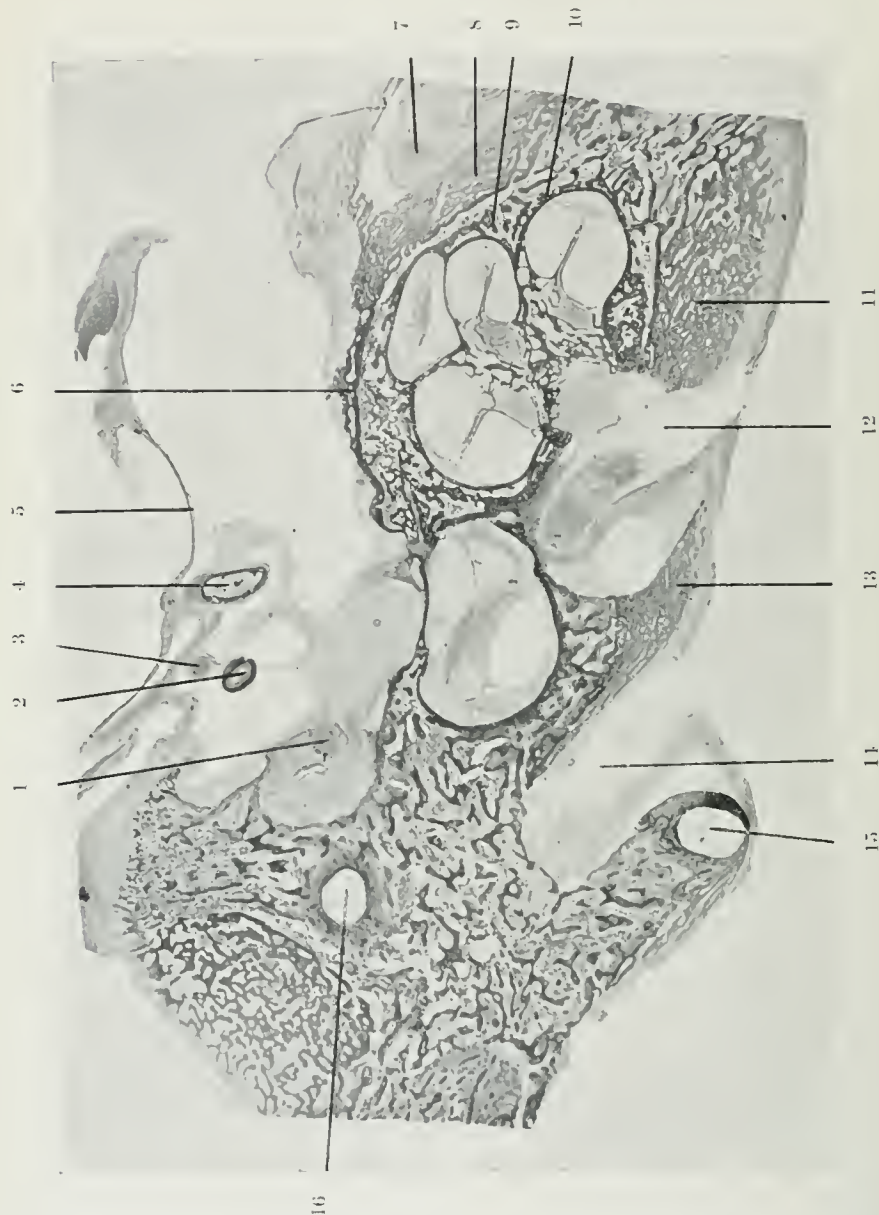


FIG. 17.—Horizontal section through left ear of seven months fetus in region of oval window. The case was said to be one of congenital syphilis, but the Wassermann reaction (as done *post-mortem*) was negative. The section shows the arrangement of the bone around the hollow spaces of the inner ear. 1. Facial nerve. 2. Long process of incus, below this the niche of the oval window contains mucoid exudate. 3. Chorda tympani. 4. Handle of malleus. 5. Tympanic membrane. 6. Lamellar bone formed by deep layer of muco-periosteum covering promontory. 7. Internal carotid artery. 8. Lamellar bone of cochlear capsule. 9. Cartilage bone of cochlear capsule; note marrow or lymph space between 8 and 9. 10. Endosteal bone of basal coil of cochlea. 11 and 13. Lamellar bone formed by osteogenic layer of dura mater. 12. Internal auditory meatus with nerves. 14. Fossa subarenata. 15. Smooth end of superior canal. 16. External canal surrounded by its layer of endosteal and cartilage bone. The neuroepithelium of the labyrinth shows marked *post-mortem* changes.

PART II. (R. M.)

The microscopical appearances seen in the study of sections from cases of otosclerosis strongly suggest the structural changes one meets with in other bony tissues in conditions of chronic toxæmia or altered metabolism. Whatever be the exciting cause of this condition we have a series of progressive changes which appear to be *purely inflammatory* in character. The ultimate result is a typical and constant lesion, viz. marked sclerosis of the bony tissue of the labyrinth capsule. The alleged absence of plasma cells does not prove that otosclerosis is of non-inflammatory origin. These cells are not present in all forms of chronic inflammation. Even when they are present they do not occur in all stages of the inflammatory process. For their detection special staining methods are required—methods difficult to apply to celloidin sections of the labyrinth.

The first change one observes in otosclerosis is the marked and general engorgement of the blood-vessels both in the fatty marrow of the bone and in the muco-periosteum. The connective tissue of these areas is also seen to increase in amount, having a loose, open, and fibrillated structure. There are more cellular areas, mainly composed of mononuclear cells, which are closely related to the congested vessels. Some of the medullary spaces in the petrous bone show leucoblastic marrow reaction. Such appearances can be explained by a toxic body brought by the blood or invading the bone from the muco-periosteum, and acting as a stimulant, especially on the connective tissues of the marrow. The condition is essentially a granulating process, which slowly brings about absorption of the bone, allowing the opening up of the medullary spaces. The deeply staining bone seen around the enlarged medullary spaces appears to be old bone which is undergoing change, and not new-formed bone, as described by various writers. The granulation tissue tends to become more fully formed fibrous tissue, and these fibres arrange themselves in concentric layers around the central vessel. Ossification of this fibrous tissue now sets in, beginning with the fibres lying in close relation to the bone trabeculæ, thus bringing about a marked thickening of the lamellæ at the expense of the Haversian canals. The inner layer of bone in the labyrinth capsule also appears to be involved in this process of sclerosis. There is an active proliferation of the cartilage cells and ossification into a bony matrix.

The above changes are seen to be of a patchy character and appear to begin at the junction of the cartilaginous and lamellar portions of the labyrinth capsule, and to spread directly along that line for some distance, extending more or less into the cartilaginous and lamellar bone on each side, and in places passing right through the cartilage bone to reach the endosteal tissue lining the cavities of the inner ear. This path of extension strongly suggests some direct channel, such as that shown to exist (J. S. F.), and wou'd explain the areas of change seen in the various parts of the labyrinth capsule.

The whole process appears to be a slow form of inflammation, a definite series of reactions of a special tissue to repair damage caused by some unknown element, bacterial or toxic.

Conclusions.

(1) Some cases of otosclerosis (spongification of the labyrinth capsule) appear to be of the nature of a blood infection, and may be called "primary." We would expect that further research would show that in these cases the bony changes are widespread throughout the skeleton.

(2) Other cases of otosclerosis undoubtedly follow attacks of catarrhal or purulent otitis media, the infective process invading the labyrinth capsule at the anterior margin of the oval window. Such cases may be called "secondary."

(3) From the clinical standpoint, heredity plays an important part in otosclerosis, but, as the condition is a chronic inflammatory process, the infective agent must gain access to the labyrinth capsule either through the blood-stream or from the middle-ear cleft.

(4) It has been proved by clinical and microscopical research that "atypical" cases of otosclerosis exist in which functional examination of the ear reveals the presence of nerve deafness. The relationship between the bony changes and the nervous affection is not yet clear.

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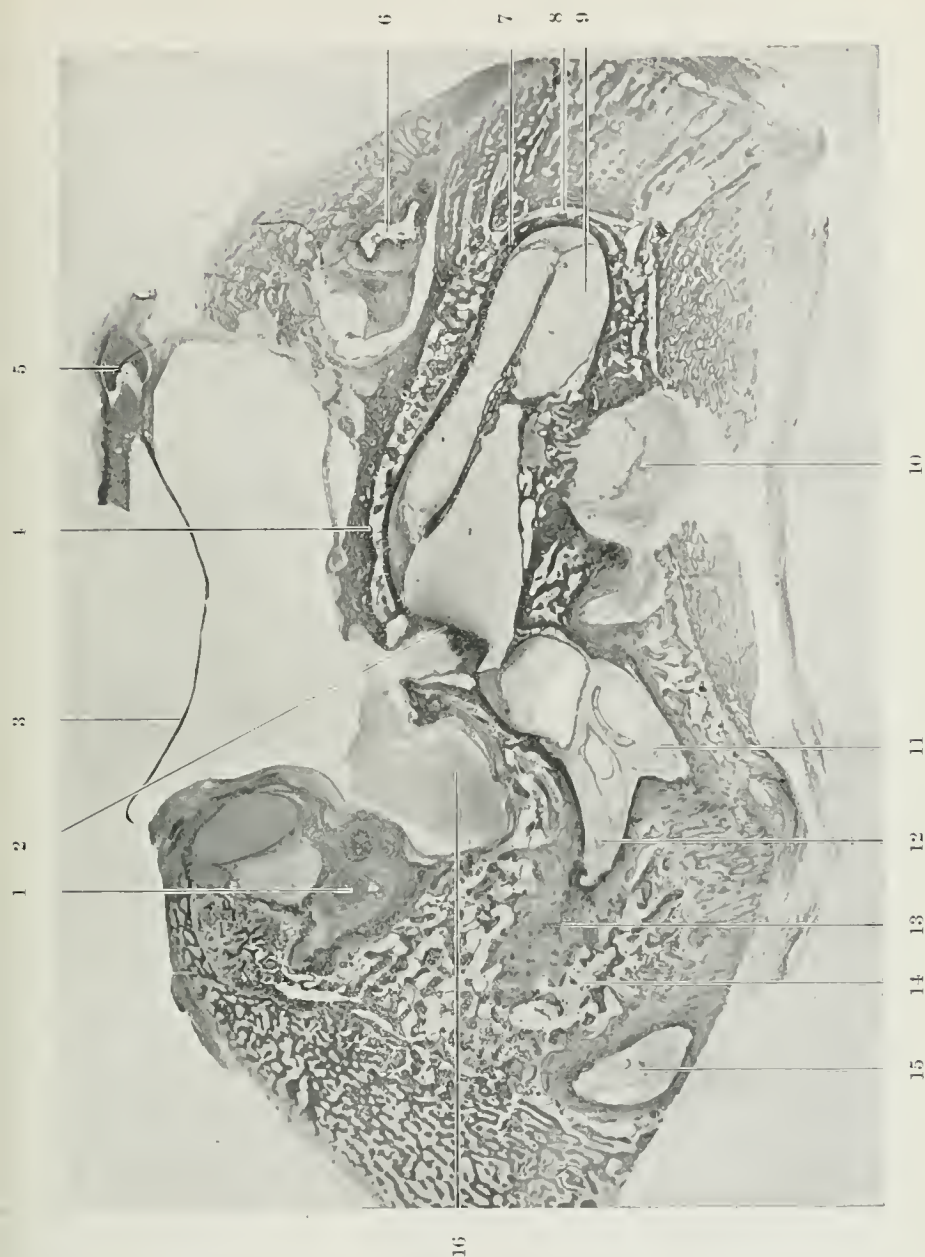


FIG. 18.—Horizontal section through left ear of seven months fetus in region of round window. 1. Facial nerve. 2. Membrane of round window. 3. Tympanic membrane. 4. Lamellar bone of promontory formed by deep layer of muco-periosteum. 5. Anterior part of annulus tympanicus. 6. Internal carotid artery. 7. Endosteal bone of basal coil of cochlea. 8. Space between lamellar and cartilage bone, the latter is very thin at this point. 9. Scala tympani of basal coil of cochlea. 10. Internal auditory meatus with dural sheath. 11. Opening of crus commune into vestibule. 12. Opening of smooth end of external canal into vestibule. 13. Dense cartilage bone of external canal. 14. Marrow. 15. Smooth end of posterior canal surrounded by endosteal and cartilage bone. 16. Sinus tympani containing mucoïd exudate.



FIG. 19.—Horizontal section through right ear of newborn child ($\times 8$ diam.), showing lymph space (3) between cartilage bone (2) and lamellar bone (4) in the capsule of the cochlea. 1, Carotid canal with artery. 2, Cartilage bone of cochlear capsule. 3, Lymph space. 4, Lamellar bone formed from deep layer of tympanic mucosa. 5, Anterior margin of oval window. 6, Malleus. 7, Footplate of stapes. 8, Incus. 9, Facial nerve. 10, External semicircular canal. 11, Cartilage bone surrounding canal. 12, Marrow. 13, Smooth end of superior canal. 14, Fossa subarcuata. 15, Vestibule. 16, Internal auditory meatus with nerves. 17, Lymph space in bony capsule of cochlea.

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CLINICAL NOTES.

THE INFLUENCE OF POSITION ON THE APPEARANCES OF THE NORMAL PHARYNX.

DOUGLAS GUTHRIE, M.D., F.R.C.S.

SOME years ago, whilst examining the throat of a bedridden patient, I noticed a swelling on the right side of the posterior pharyngeal wall, the appearance in fact strongly suggesting that of a retropharyngeal abscess.

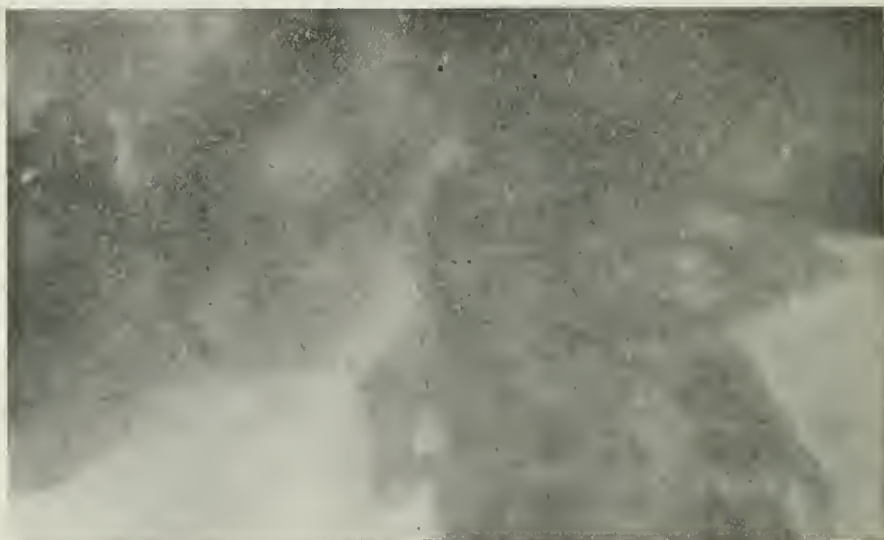
The patient's head was, at the time, acutely turned towards me as I stood to the right of his bed. Examination in the ordinary position, however, convinced me that the pharynx was normal and that the peculiar appearance I had observed was solely dependent upon my patient's unusual attitude.

This observation may be verified by anyone with great ease. Let any patient be seated sideways, as though about to have the right ear examined. Then direct him to turn his head so that he looks over his

right shoulder towards the examiner. It will then be noticed on inspection that the right half of the posterior pharyngeal wall is unusually prominent and that a very complete view of the right tonsillar region is obtained.

When the patient turns his head towards the left, the appearances are, of course, reversed.

I am not aware that this simple fact has been previously noted, though it appears to be of some practical value. In the routine examination of the pharynx such an alteration in the position of the patient's head improves the view very greatly. The lower pole and lingual prolongation of the tonsil become distinctly visible, a "buried" tonsil is rendered much more prominent, and if, with a narrow spatula, the



tongue be gently pressed towards the opposite side, the anterior surface of the epiglottis may be readily inspected in the majority of cases.

The cause of the phenomenon is shown in the accompanying radiograph.

A small quantity of bismuth emulsion has been injected into the centre of the right tonsil (an enlarged tonsil which I was about to enucleate).

The patient's head is turned towards his right shoulder. This rotatory movement takes place chiefly at the joint between atlas and axis vertebræ; the lower cervical vertebræ do not participate in the movement. Even the axis vertebra rotates only slightly. The right transverse process of the axis is very prominent in the photograph, and, situated as it is behind the angle of the lower jaw and behind the small shadow of the bismuth in the tonsil, there can be little doubt that it is the cause of the retropharyngeal swelling which makes its appearance when the head is in this position.



FIG. 20.—Horizontal section ($\times 12$ diam.) through labyrinth of full term fetus showing island of cartilage (3) in the bone of the anterior margin of the oval window. 1, Footplate of stapes. 2, Track of cartilage. 3, Fetal rest of cartilage. 4, Endosteal bone. 5, Lamellar bone. 6, Cochlear nerve. 7, Vestibular nerve. 8, Saccule. 9, Utricle.

TO ILLUSTRATE MR. J. S. FRASER'S AND MR. R. MUIR'S ARTICLE ON THE PATHOLOGY OF OTOSCLEROSIS.

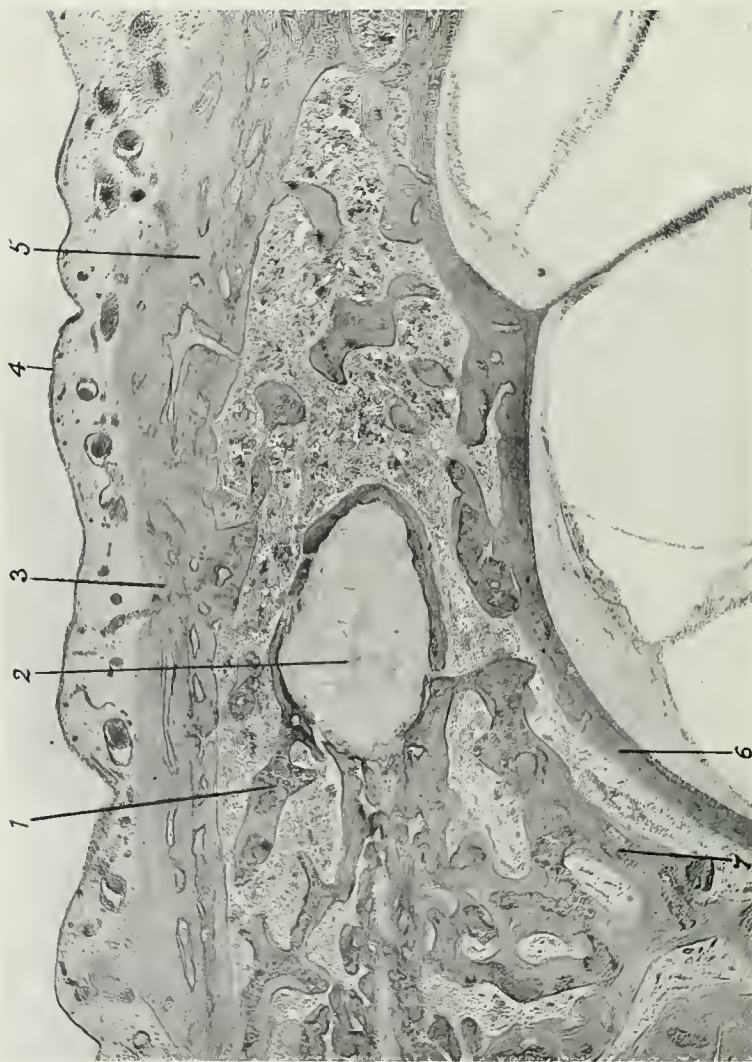


Fig. 21 (part of Fig. 20: $\times 45$ diam.).—Anterior margin of oval window from full term fetus showing remains of fetal cartilage. 1, Cartilage or interglobular bone. 2, Rest of fetal cartilage. 3, Lamellar or periosteal bone. 4, Mucosa of tympanum. 5, Endosteal bone. 6, Cartilage or interglobular bone. 7, Cartilage or interglobular bone.

TO ILLUSTRATE MR. J. S. FRASER'S AND MR. R. MUIR'S ARTICLE ON THE PATHOLOGY OF OTOSCLEROSIS.

SOCIETIES' PROCEEDINGS.

ROYAL SOCIETY OF MEDICINE—OTOLOGICAL SECTION.

May 19, 1916.

Dr. ALBERT A. GRAY, *President of the Section, in the Chair.*

The Pathology of Otosclerosis, Congenital Syphilitic Deafness, and Paralabyrinthitis.—J. S. Fraser.—(See p. 465 of this issue.)

The PRESIDENT: These specimens are particularly interesting to me, especially the one in which Dr. Fraser described otosclerosis arising in the course of suppurative middle-ear disease. Clinically, some years ago, I concluded that there was more frequently an association between suppurative middle-ear disease and otosclerosis than is commonly supposed, but I have never found a case in which one could demonstrate it pathologically; and I am very grateful to Dr. Fraser for having shown what I believe to be the first case which proves the relationship between the two. Clinically, as one knows, one frequently meets cases of extreme deafness in comparatively young people associated with suppurative middle-ear disease, but the degree of the deafness is out of all proportion to the middle-ear condition. In these cases it is very apt to be assumed that the condition is one of pure middle-ear disease that is the result of suppurative middle-ear disease. When I studied the question of heredity in relation to otosclerosis, I found there was sometimes curious relationship; I found two or three families in which there was marked otosclerosis, and in some of those families one or two individuals had suffered from suppurative middle-ear disease. In such circumstances I found that when middle-ear disease occurred in such families, it called otosclerosis into existence at a much earlier time in life than amongst other members of the family, and the deafness reached a higher degree. The middle-ear inflammation appears to cause antedating of the otosclerosis. But we must be very careful about assuming that the otosclerosis is therefore necessarily due to infection proceeding from the middle ear: I think all it does is to excite the condition in those predisposed to it. The difficulty about the ideas of speaking of otitis media or osteitis in otosclerosis lies in the fact that we find utterly different changes in the other parts: there is an atrophy of the ceruminous glands, a diminution in the sensitiveness of the tympanic membrane, of the meatus, etc., and I think it quite probable that there are changes in the nerve-cells of the cerebral cortex or other portion of the auditory tract which may account for the tinnitus. I do not think the tinnitus is explained by the changes in the internal ear. In three out of the four cases I had, the internal ear appeared perfectly normal.

Dr. P. WATSON-WILLIAMS: It is very interesting and a great privilege to see such a splendid series of microscopical specimens, which represent enormous labour. I have long been rather attracted by the

suggestion which Dr. Fraser has put forward as to the possibility of otosclerosis being, at any rate in some cases, due to toxic absorption or to some chronic inflammatory process. It is a view which I have myself taught and advocated. For the last six or seven years I have been endeavouring to see how far one could obtain evidence of such source of infection in the posterior ethmoidal cells or the sphenoidal sinuses, because I think it is as reasonable to look to these parts for the source of infection as to the ear itself. One often encounters cases of pure otosclerosis in which signs or history of inflammatory ear conditions are entirely absent. And in a certain proportion of cases careful investigation has led to my discovery of chronic or very latent infection of sinuses. It may so happen that we may have to look for other foci as possible sources of infection. But it seems that, just as in cases of canicular optic neuritis following on sphenoidal sinus infection, the infection may be very slight indeed, and sometimes it is only by means of delicate cultural methods that it can be demonstrated that there is any infection of these cavities. And we may explain the marked toxic infection where there is such a marked absence of suppuration as being due to the fact that there is no phagocytosis because of the poverty of leucocytes. Therefore instead of a suppurative process and grosser evidences of infective inflammation, there is simply a comparatively uninhibited chronic infection. The condition just mentioned may also set up otosclerosis, and yet the chronic infection may be overlooked owing to the absence of pus or other gross evidences of infective inflammatory processes.

DR. DUNDAS GRANT: Dr. Watson-Williams has touched on a point of great importance from the practical aspect—namely, that otosclerosis may depend upon an absorption of toxins. There may be many different causes of otosclerosis, which it would be impossible now to discuss. At one time I formed the impression that it occurred in association with chronic osteo-arthritis. Many cases may be of that nature. The aetiology of otosclerosis is very various, and Habermann, in a long paper, associated it in some cases with tuberculosis, in others with syphilis. Dr. Fraser has referred to Hennebert's observation that in cases of congenital syphilis there might be the "fistula" symptom, and I would ask Dr. Fraser whether he thinks it is possible that such softening of bone as he describes may be sufficiently great to permit of it yielding under any pressure which can be exerted by means of the Politzer bag in the external meatus. We are very much indebted to Dr. Fraser for his very clear demonstration.

DR. DAN MCKENZIE: I join in thanking Dr. Fraser for a very excellent exhibition of pictures, and congratulate him upon his industry, and upon his opportunities which that industry has enabled him to utilise to the full. Turning to Dr. Fraser's theoretical allusions, I am inclined to the view that the changes which he has shown, which resemble those of the classical otosclerosis, are really changes similar to those, but the result of different causes. I take it that bony changes may show resemblance to each other and yet be due to diverse causes; and I question, therefore, whether the specimens he has shown us are sufficient to displace the original idea of classical otosclerosis being unconnected with inflammatory change. That connection must be actually established before we can agree. I do not know whether Hennebert's observations have been confirmed. ["Yes."] It has often occurred to me that the secretory changes, to which the President has

alluded, which take place in otosclerosis may be due not so much to a common origin with the otosclerotic changes in the labyrinth capsule as to the secondary effect of the abolition of function. I think secretory changes of that description do occur reflexly at times.

The PRESIDENT: One can understand them occurring reflexly, not from changes in bone, but from changes in the nervous system. I could not imagine a bone in the labyrinthine capsule causing diminution in the secretion of wax.

Latent Tuberculosis of the Lateral Sinus Secondary to Chronic Suppurative Otitis Media; Histological Specimen of the Sinus Contents.—Sydney Scott.—A little girl, A. C.—, was aged two years and three months when discharge from the right ear began. Six months after, caseous cervical glands from the right side and a large mass of adenoids were removed. When aged five years and three months a mastoid abscess appeared on the right side, and a simple mastoid operation was performed. The wound healed except for a small sinus. She was first seen in consultation six months afterwards, when the sinus was still present, together with discharge from the ear, which had never ceased. There was also a deep-seated gland behind the angle of the jaw on the same side. The child was plump but pale; her daily temperature for three weeks was between 99° F. and 100° F.; the tongue was slightly furred. She had complained a little of headache at times, but she had not vomited, nor had she had fits or rigors, and though quiet would run about and play as usual in or out of doors. The tympanic membrane was obscured by pale granulations deep in the meatus. Otherwise there was no other evidence of disease in other parts of the body.

Operation: Schwartz's operation was performed, but more extensively than appeared to have been done before. The dura mater was exposed posteriorly, and here a considerable circular area (3 cm. or 4 cm. in diameter) was found covered with pale gelatinous granulations, which had a close resemblance to a cerebellar hernia. However, when the bone was freely removed and the granulations between the occipital bone and the dura mater were scraped away, it was seen that the dura mater itself was intact, and that the lateral sinus did not contain blood. The sinus was thereupon opened and found to contain an adherent fibrous mass, with loculi of pus and caseous debris. This was removed by curetting, and the sinus exposed back to the torcular before a normal condition was reached. Here free bleeding took place, and this was arrested by inserting a muscle-graft into the sinus, a short distance from the torcular. The upper entrance to the jugular bulb, but not the bulb itself, was then exposed. There was no bleeding from this end. Pale granulations were curetted out of the antrum, but the incus, which was seen, was not disturbed, neither were the malleus nor tympanic membrane touched. The posterior wall of the bony meatus was removed, leaving the tympanic ring only, but the fibro-cartilaginous meatus was left intact. The skin incisions came well together and were sutured, only a small opening for a drainage-tube being left in the antral region. At this time it was anticipated that some further operation would probably be required to deal with the contents of the tympanum, to expose the jugular bulb, and remove the deep-seated glands in the upper part of the neck, but as the wound healed and the otorrhea ceased, and the granulations disappeared from the meatus, nothing more has been done. It is nearly a year since

the operation, and there is no sign of any return of the disease. Moreover the cervical glands are no longer palpable.

The histological specimen (shown) demonstrates the contents of the adherent and organised clot in the lateral sinus, with many fibro-caseous tubercles and numerous giant cells.

Double Acute Otitis Media complicated by Ulcerative Endocarditis; Death.—**E. D. D. Davis.**—An unhealthy youth, aged sixteen, attended the out-patient department on April 7, complaining of a discharge from both ears and of recent earache. Five weeks previously he had had so-called influenza, and when seen on April 7 both ears had been discharging freely for a few days, but there was no pain and no sign of mastoid involvement, though the temperature was 101.6° F. Suitable treatment was prescribed, and, three days later, he returned with a temperature of 103° F., with tenderness, redness, and slight cedema over the lower portion of the left mastoid process. A simple mastoid operation was performed almost immediately, but only a little muco-pus was found in a large apical mastoid cell. The mastoid antrum and lateral sinus were normal. The day after operation the temperature was normal, but it rose again on the second day to 104° F. The patient was thoroughly examined by a physician and no cause for the fever was discovered. The mastoid wound was normal.

On April 21, ten days after the operation, a deep-seated swelling was found in the left forearm in connection with the ulna. This was punctured with a needle and some pus aspirated, which produced streptococci. The patient had no rigors and denied that he had any pain. The forearm abscess was an accidental discovery. The mastoid wound had practically healed and was normal, but pus from the wound and the blood contained streptococci on cultivation. The blood count was normal.

At this time a murmur was discovered on auscultation of the heart, and a history of rheumatic fever six years ago was obtained. The diagnosis of ulcerative endocarditis was established; embolism of the left posterior tibial artery occurred, followed by gangrene of the foot, and the patient died one calendar month after the simple mastoid operation.

It is assumed that the mastoid operation was unnecessary, but the relatives positively refused a *post-mortem* examination.

The PRESIDENT: The endocarditis was probably also secondary to the streptococcus infection, and I think it is very probable that the boy had some valvular lesion before, resulting from the rheumatic fever five years ago, and that the streptococcus found a suitable nidus on the valvular lesion. Many physicians hold that ulcerative endocarditis is not a specific disease in itself, but that it may occur whenever there is a septic infection, especially in those who have a valvular lesion.

Mr. DAVIS (in reply): A physician examined this case thoroughly, but he may have overlooked the cardiac lesion. Until this boy had influenza there were no signs, and it is possible rheumatic fever would account for the weak spot in the endocardium.

An Obscure Complication of Middle-ear Suppuration.—**E. D. D. Davis.**—A boy, aged 16, was sent to hospital by his doctor with a diagnosis of brain abscess. He had been ill for fourteen days with severe headache, occasional vomiting, and a discharge from the ear of indefinite

duration. He was seen on admission by a surgeon, who decided to "wait and see." Three days later the temperature was 105.4° F., respiration 40, pulse 130. He looked ill and complained of pain in the chest. The right ear was discharging freely, the surface of the mastoid process had been blistered before admission, and as far as could be ascertained there was no definite sign of mastoid suppuration.

An examination of the chest revealed signs of consolidation of the left lower lobe of the lung, with a localised pleuritic rub; in addition there was a history of a rigor. The diagnosis of lateral sinus thrombosis was made, and I operated on the mastoid at once.

At the operation the mastoid antrum was found to be deep to, and overlapped by, the lateral sinus and to contain pus and granulation tissue. The sinus was exposed for 1 in., but no pus was present in its groove. Then a gauze plug was inserted at the upper end of the sinus groove for compression before opening the sinus; it was seen that the sinus was not thrombosed, as it readily collapsed and deflated, so to speak. The sinus was freely incised, and, on removal of the gauze, extensive hæmorrhage occurred.

On the day after the operation the temperature fell by crisis, and has remained near the normal for more than a week, and the patient appears to be practically well. Free hæmorrhage occurred when the gauze plugs were removed forty-eight hours after operation. At the time of the operation it was felt that there was not sufficient cause in the mastoid for the serious condition of the patient, and the physical signs in the chest were possibly due to lobar pneumonia. Lumbar puncture produced normal and sterile cerebro-spinal fluid.

Fracture of the Base of the Skull in a Baby.—E. D. D. Davis.—

A little girl, aged one year and nine months, was seen on account of acute otitis media with hæmorrhage from the left ear. The child looked well, but there was a copious blood-stained discharge from a perforation in the lower half of the left drum. The temperature was normal. Three days later the child was standing on her bed and fell to the floor on to her head. The right forehead was extensively bruised, and a profuse discharge of clear cerebro-spinal fluid from the right ear commenced. When she was seen four days after the fall dressings were soaked with cerebro-spinal fluid which could have been collected in a test-tube. When the child cried the fluid pumped out of the ear, and it was not possible to see the drum. The temperature had risen to 103° F. on the fourth day, and a further report of the case will be given later. Apart from the discharge of cerebro-spinal fluid there were no other signs of a fracture of the skull. The left otitis media had improved considerably.

Mr. DAVIS: I heard yesterday that the child was doing well, and that the temperature was normal, but there was some rigidity of the neck; and I have been expecting all the week to hear that meningitis has developed, and that trephining would be necessary. Should meningitis occur, I think one would be justified in opening the middle and posterior fossæ for drainage.

Note by Mr. Davis.—The course of the case is now complete. The child died sixteen days after the accident from meningitis. Operation was refused.

PROCEEDINGS OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION.

Niagara Falls, Canada, June 1, 2, 3, 1915.

(Continued from p. 454.)

The Effects of Radio-activity Upon Naso-pharyngeal Fibroma.
--D. Bryson Delavan.—The conditions due to the presence of this growth are usually so urgent as to demand relief. For this three varieties of treatment have thus far been practised:

(1) Removal of the tumour after preliminary operation done for the removal of obstructing parts.

(2) Removal through the natural passages by evulsion or with the cold snare.

(3) The reduction of the size and the vascularity of the tumour by electrolysis or by the injection of various chemicals, followed by the removal of the remaining mass by means of the galvano-caustic loop.

Of these methods the first is illogical, unsurgical, and, as experience has abundantly proved, deadly; shock from the preliminary operation is severe, hæmorrhage profuse, and if the patient survive, deformity from the preliminary operation is serious and recurrence of the growth common.

The second method is much better than the first, but may provoke serious hæmorrhage and shock, and is apt to be followed by recurrence.

The third method is by far the best. Although tedious and sometimes painful and requiring considerable skill, statistical comparison shows that of twenty-seven cases removed after severe preliminary operation in which end results were given, 59 per cent. were reported "cured" and 26 per cent. died. Of forty-one cases removed through the natural passages by evulsion or the cold snare, 5 per cent. died; and of sixty-six cases by electrical methods, 100 per cent. were cured. Much attention has of late been given to the treatment of uterine and other fibromata by means of the X ray and of radium, and both in the United States and in Europe the apparent success attained renders the method worthy of consideration. The similarity of the type between the uterine and pharyngeal growths at once attracts the attention of the laryngologist to the new treatment.

Fibromata of the naso-pharynx are relatively much smaller and more directly accessible. The complete reduction of the naso-pharyngeal growth might not be essential, since it tends to diminish spontaneously after adolescence, and finally disappears. If its growth could be controlled during the earlier years and until after the period of its activity, Nature would in some cases at least intervene to effect a cure. Cases of slow development occurring in older rather than younger patients would offer the best prognosis. Judging from the effects of radium in other cases, its action would be active and profound; more may reasonably be expected from it than a moderate reduction in size. Dr. Robert Abbe, pioneer in the use of radium in the United States, has originated many ingenious devices for its application to various organs of the body, and especially for its use in the nasal and naso-pharyngeal region. In the application of the radium, the parts to be treated must be exposed to the

rays, and the healthy surrounding parts must be protected from them. It is not necessary that the radium should be introduced bodily into the substance of the growth, as the blood-vessels of the growth are more abundant near its surface, and as the rays penetrate at least a quarter of an inch, the treatment is entirely effective in profoundly influencing the circulation, and thus, as well as by its effect upon the connective tissue of the organ, causing a reduction of its size. Proper regulation of the strength of the radium and the duration of the exposure will prevent injury to the surrounding healthy parts. Should the radium treatment prove as valuable as it promises, the world may be congratulated that the unhappy record of past surgical failure will have been closed.

Dr. CORNELIUS G. COAKLEY: Dr. Francis Carter Wood has been experimenting on various animal colonies with radium; he has also done some clinical work with this agent. He has been kind enough to use it in several cases which I have sent him during the past year and a half. In a case of epithelioma of the nose, radium had a very favourable effect. The patient had a bad case of arterio-sclerosis and died from cardiac trouble. All trace of the epithelioma had disappeared. Several cases of papilloma of the larynx were cured by radium. In one case the papilloma had existed from early childhood to the age of forty or more. In another case treated by him there was an angiofibroma which completely filled the nasal cavity, the mass being visible without a nasal speculum. He used 18 mgrm. in a very small glass tube wrapped in ordinary adhesive tape. This was thrust into the nose, and was followed by profuse bleeding. At the end of two weeks no change in the mass could be noted. For some reason the boy did not return to the clinic for eight or ten days, and when he returned it was found that the mass had decreased in size. A brass capsule containing 83 mgrm. of radium was then inserted, the posterior end of this tube extending into the posterior naso-pharynx. This was left in for twenty-four hours. The excoriation all round the face was simply remarkable. No X-ray burn ever compared with this burn. Dr. Wood told me I need not worry about it, as it would disappear, which it did. The radium was applied in February, and the inside has not completely healed. The patient can breathe through the nose, however, and it is possible to look right through into the naso-pharynx. The mass is attached to the posterior wall of the nares and apparently somewhere in the posterior ethmoidal region on the left side. Since the radium has been used the hæmorrhages which the patient had at irregular intervals have almost entirely ceased. The radium is likely to cure this fibroma. A smaller dose in this case would probably have been better.

Dr. OTTO T. FREER: I have used radium, but not in the treatment of fibroma. We have at our command a means which we did not have a few years ago. I have removed a very large fibroma, with a keen knife, from behind, after having injected directly into the growth a double dose of pituitary extract, two ampullæ, followed by adrenalin. The hæmorrhage did not exsanguinate the patient. There has been one recurrence since. Would not the combination of surgery with radium be less tedious and more satisfactory than radium alone in the removal of fibroma that enters all the cavities? I was interested in the recovery which Dr. Coakley reported. Dr. Frank Dudley Simpson, of Chicago, who has employed it so extensively, says he has never had a recovery. I would like to ask Dr. Coakley how long, after the use of the radium, the burn appeared, and how long the radium was used.

DR. COAKLEY: This is not the only burn which has come under my observation. I recall a case treated by Kelly, in which there was a most terrific burn, resulting in extensive infiltration and suppuration. That was a year ago last December. There was a recurrence of the epithelioma of the larynx, and the patient went down some time in March for further treatment. The radium was used without external reaction, but with such extensive internal reaction, with swelling of the arytenoid folds and aryepiglottic tissues, that it was almost necessary to do a tracheotomy. In the case I cited, the boy had had no treatment for a week, when superficial ulceration appeared all over the skin of the nose and cheek. It was extraordinarily painful. The pain following the use of radium is what patients object to. There is no question of its activity.

DR. DELAVAN, closing the discussion: I cannot conceal my great satisfaction with regard to the case which Dr. Coakley has presented. I have been studying this matter of naso-pharyngeal fibroma ever since I was an undergraduate student. I have seen the best surgeons take these cases and end with very unsatisfactory results. Statistics show that surgical procedures of any kind are dangerous. Evulsion, removal with a snare, and other methods, may be followed by hæmorrhage. As far as I can compile statistics on the subject, there are five deaths in a hundred as the result of shock or hæmorrhage. There is always the danger of recurrence. The application of radium requires a certain amount of skill, but no surgical skill.

SYMPOSIUM.

The Consideration of Pansinitis Exclusive of External Operations.

The Ætiology of Pansinitis.—J. Gordon Wilson.—There are local anatomical and physiological factors which explain why pansinitis does not occur more frequently, factors which, when they are defective or destroyed, lead to its occurrence and persistence. Of great importance are the ciliated cells and the lymphatic system. The action of the cilia and the arrangement of the lymphatics are such that in each sinus there is an independent anatomical and physiological mechanism of simple type, adapted to free the cavities from such local irritants as may arise during the normal life of the cells which line it, or may accidentally invade the sinus during the respiration; and an isolated lymph system giving protection against microbe invasion. On the other hand, the vasomotor mechanism is common to all.

During a rhinitis, as the local inflammation subsides the congestion in the sinus disappears, the cilia rapidly recover, and the exudate which is not absorbed is cast out by the ciliary movements, and the sinus recovers. If, however, the inflammation be so acute that the physiological protectors and barriers are interfered with or no longer effective, the morbid processes are different. The result is an interference with ciliary action and a lymphatic stasis. In chronic pansinitis the same processes are at work interfering with the removal of secretion, producing a lymph stasis and finally a bacterial invasion. Other factors may influence these processes, as, for example, narrowing or obstruction of the ostia or nasal cavity from mechanical causes; disease in the adjacent part of the nasal cavity which has resulted in destruction of the cilia; scar tissue, or tissue devoid of cilia, either from disease or from a nasal operation. The chronic turgescence may be so gradual in onset as never

to awaken suspicion. It may be so slight that is beyond our diagnostic ken. It may be so slight that bacterial activities and toxine effects are counterbalanced by tissue activities or antibodies within the limits of health. In such cases a slight increase in congestion may be enough to disturb the balance; or debilitating diseases and hematogenous infections set up a pansinusitis.

The writer sketched briefly the organisms found. He believed that the organism is most often an invader into an already damaged sinus. Since the same morphological organism can vary so much in its virulence, until we know more about the cause of this variation we are not likely to get far in considering its ætiologic significance. A healthy sinus has great protective power against bacterial invasion and great recuperative power after the simple hyperæmias which occur during a rhinitis. We have the potentialities of a pansinusitis in the chronic rhinitis with its constant or recurring circulatory disturbances, vascular and lymphatic, with the risk of excessive accumulation of foreign exudate, and a nasal cavity more or less infected. The disturbance resulting from the first is such that there follows the failure of the second, which inevitably leads to the invasion of bacteria. It is well to remember the possibility of an accessory sinus being charged by the products of a low-grade inflammation which apparently show little or no local effects. The wise treatment will recognise why Nature has broken down and aim as far as possible at compensation. It will aim at not leaving any one sinus so impaired that it acts as a source of danger. To replace epithelium in a dependent cavity by scar tissue is to replace it by tissue with no physiological action. I cannot conceive of a healthy antrum ever existing after extensive curettement.

The teaching of Nature is obvious. The mucous membrane of the accessory sinus is doing important work. We may aid by reducing chronic vascular and lymphatic engorgement. We may aid by assisting in the removal of excess of secretion. But if we do so at the expense of permanent damage to the ciliated walls, we may well go slow, and ask what compensation we offer for this loss.

The Non-operative Treatment of the Accessory Sinuses.—Lewis A. Coffin.—The writer has ceased to think of the cure of the diseases of the accessory cavities of the nose by either operative or non-operative procedure, and is satisfied when he has accomplished a result sufficient that he may consider it as arrested. Negative pressure in conjunction with autogenous vaccination has been followed by very satisfactory results.

By means of his special apparatus the writer applies suction, drawing mucus from the cavities, using in special instances a cannula connected with the suction apparatus; following this, air is made to enter the vacuumised cavities under considerable pressure, medicated by a nebula of oil variously laden with remedial agents.

By using autogenous vaccines in conjunction with this procedure he has been able in two chronic cases to cause an entire cessation of discharge, in which suction alone in conjunction with the vaccines had failed entirely.

The negative pressure should be started low and gradually increased, while the nebula is thrown into the nose under a pressure of ten to fifteen pounds.

For medication he uses either an oil loaded with Bulgarian bacilli or an iodine preparation. A description of the apparatus followed.

Abstracts.

NOSE.

Grayson, Charles Prevost.—Exploratory Opening of the Sphenoidal Sinus. "Laryngoscope," 1915, p. 65.

Grayson states that a large number of empyemata of the maxillary and frontal sinuses are cured after the establishment of proper drainage combined with cleansing and antiseptic irrigation. These cases include many of the chronic class. Grayson now advocates the making of an artificial opening in the anterior wall of the sphenoidal sinus at a point as close as possible to the angle of junction of the floor with the internal wall. He considers this opening on a par with the puncture of the nasal wall of the antrum beneath the inferior turbinate, and states that it is usually even more easily performed. The opening can be utilised for both exploratory and therapeutic purposes. The point indicated is the safest at which the sinus can be entered, and it is most remote from those intracranial structures which lie in relation to the roof and external wall of the sphenoidal sinus. Grayson deprecates the frequently unnecessary removal of the middle turbinal in order to attack the sphenoidal sinus through the natural ostium. The floor of the sinus lies, with remarkably few exceptions, not more than 2 or 3 mm. above the crescentic line that marks the base of the sphenoid body and the upper margin of the choana. Further, the septum between the right and left sinuses, however much it may deviate to one or other side posteriorly, almost invariably occupies the middle line anteriorly. Grayson recommends that a series of radiographs should be taken at different angles, in order that we may have all the knowledge necessary to make the opening of the sphenoid as nearly as possible free from risk. The technique of the operation is as follows: The nasal portion of the anterior surface of the sphenoid body is exposed as widely as possible by shrinking the turbinates with an adrenal preparation combined with cocaine. The course of the speno-palatine artery is now usually so distinctly visible that it can be readily avoided. Grayson now paints on dilute tincture of iodine and then applies a straight drill, tipped with a conical burr, 6 mm. in length, and measuring $2\frac{1}{2}$ mm. from its point to its greatest diameter. Behind the conical burr there is a collar. The point of attack is 2 or 4 mm. above the line which divides the anterior from the inferior surface of the sphenoid body and close to the attachment of the ethmoid plate in the middle line. The opening that it makes is 2 mm. in diameter, quite sufficient to permit the escape of any fluid and to allow the introduction of an irrigating cannula or the distal jaw of a biting forceps, with which the opening may be enlarged. The operation is not accompanied or followed by any pain or shock, and if the exploration be negative the hole will close within twenty-four hours. Grayson holds that we should begin our operations upon the anterior wall of the sphenoidal sinus at the point of greatest safety instead of ending there. The following indications for the operation are given: (1) When we cannot be positive whether a stream of pus coming from the speno-ethmoidal recess has its source in the posterior ethmoidal cells or in the sphenoidal sinus, or in both. (2) In certain cases of neuralgia of the fifth nerve, which may be associated with trouble in the sphenoidal

sinus. Certain severe and persistent headaches also come into this group. (3) Cases of naso-pharyngeal catarrh in which the nasal cavities proper and the other accessory sinuses can be excluded.

J. S. Fraser.

Hanger, Frank M.—Intranasal Operation for the Cure of Dacryo-cystitis. —“Laryngoscope,” 1915, p. 23.

Hanger enumerates the following operations for the cure of dacryo-cystitis: (1) Slitting the lower canaliculus. (2) The use of probes and irrigation; intranasal operation is not justified until these methods have been faithfully tried. (3) Extirpation of the lacrimal sac; this causes scarring, and leaves the patient with an annoying epiphora. (4) Toti's operation consists in making an opening externally over the lacrimal sac and removing the bone so as to expose the mucous membrane of the middle meatus. A hole is then made into the sac and one in the nasal mucous membrane. The edges of the two openings are then united by fine sutures. This operation leaves a scar, and in many cases the internal opening slowly closes. (5) The window resection of the lacrimal canal is performed from within the nose. Part of the ascending process of the superior maxilla and part of the lacrimal bone are chiselled away so as to expose the lacrimal sac, which is then opened. West claims to cure 90 per cent. of his cases. (6) Yankauer tries to preserve the long arm of the lacrimal syphon, and therefore dissects up a muco-periosteal flap from over the site of the lacrimal nasal duct. (Yankauer's operation is too complicated to be explained without the aid of diagrams.—J. S. F.) Hanger himself operates with the patient in the sitting position and uses local anæsthesia. A few drops of equal parts of a 20 per cent. solution of cocaine and adrenalin are injected into the lacrimal sac. A small lacrimal probe coated with cocaine powder is now passed into the sac and the cocaine worked down into the nasal duct. In a few minutes the canal is anæsthetised so that larger and larger probes can be passed into the nose. Theobald's No. 13 is now left *in situ*. The inferior turbinal and the region of the nasal duct are then anæsthetised, special care being given to the outer surface of the inferior turbinal. The anterior third of the turbinal is now removed, exposing the lower end of the lacrimal probe. It may now be necessary to chisel away the lower anterior part of the lacrymo-nasal duct, but in many cases even without this procedure it is possible on slowly withdrawing the lacrimal probe to introduce the male blade of the special punch forceps into the canal, and so to bite away the inner wall up to a point beyond the stricture. The duct is thus converted into an open gutter, which can be extended into the sac if necessary. It is best to pack the nose for twenty-four hours and to irrigate the lacrimal sac for a few days. Drainage of tears should be perfect in a week's time or less.

J. S. Fraser.

EAR.

Grant, J. Dundas.—Shell Shock without Visible Signs of Injury. “Proceedings of Royal Society of Medicine, Sections of Psychiatry and Neurology,” February, 1916, p. 33.

The speaker confines himself to remarks concerning mutism, stammering, and deafness.

In the treatment of mutism he deprecates the employment of violent measures during the period of exhaustion. He looks upon these patients

as having, in a manner of speaking, forgotten how to speak. The first step is to place the back of the patient's hand under the teacher's larynx, so that he may feel the vibrations produced by the utterance of the voice; the hand is then transferred to the patient's own larynx, and he is encouraged to produce the same feelings, and ultimately the same sort of sound, in the larynx.

From this he is gradually led to alter the shape of the mouth cavities for the production of vowels and later of consonants. In some cases of concussion-mutism the voice is restored at one sitting, but in others it is a gradual process. There is no simulation about the inability to speak; the patient's anxiety to do so is unmistakable, and his delight at the gradual acquisition of words and phrases quite confirmatory. In two cases the observer has noticed that the voice returns before the hearing, and he thinks that the act of uttering sound has helped to arouse the hearing faculty.

Archer Ryland.

Brady, A. J.—Foreign Bodies in the Ear. "The Medical Journal of Australia," April 22, 1916.

At a clinical demonstration Brady demonstrated a number of foreign bodies removed from the ear, and the region of same. Two were unusual—they had not gained entry through the external auditory canal.

CASE 1 was a piece of slate pencil, sharp at the end and 2 in. in length. The patient, a boy, aged seven, had suffered from a running ear all his life. He had been treated in hospital by a specialist before he came under Brady's care. The latter found a granulomatous condition in canal which recurred several times after removal. Noticing a dark spot on the post-meatal wall, about two-thirds the depth of the canal inwards dead bone was believed to exist. The mastoid was opened in the usual manner, and the slate pencil was found lying horizontally embedded for its whole length in the mastoid process. It had broken off flush with the bony canal, so that none of it showed in same. There was no history of how it got there. The mother remembered that when a small child he one day cried for a long time as if in pain.

CASE 2 may throw some light on how the accident in Case 1 occurred.

A girl, aged two and a half, was brought to Brady on account of a running ear of some weeks' duration. There was a granuloma showing in meatus and a free flow of pus. The father mentioned that seven weeks previously the child had fallen on a stick which she had in her mouth. He had to use some force to pull the stick out of the soft palate in which it was embedded. Under open ether the ear was curetted, and the sharp end of a wooden skewer one half-inch in length was extracted. Evidently after penetrating the soft palate the skewer had penetrated the posterior wall of the glenoid cavity, and broken off in the middle ear during extraction of the main shaft. Both cases healed completely in a short time after operation.

Cases of previous unskilled attempts to remove foreign bodies were detailed. A bead which had been forced into the middle ear gave much trouble. A fine forceps moved it, till a fine hook was inserted in the eye of the bead.

Two cases, where a large red beetle $1\frac{1}{2}$ in. in length had flown into the ear and become impacted there, were recorded. In these cases the pain is maddening. One was encountered when bicycling; there being no immediate means at hand to remove the insect, the ear was filled with lubricating oil, which stopped the struggles of the creature.

Brady warned against the dangers of unskilled attempts to remove foreign bodies. Most foreign bodies if not impacted will come away by syringing with warm water. A clean foreign body may remain in the ear for a considerable time without harm. Living creatures must be removed at once, or killed on account of the pain which they cause by their struggles. Filling the ear with a mineral oil will kill them.

Author's Abstract.

Dawson, G. de H.—A case of Shell Concussion: Treatment by General Anæsthesia. "Lancet," February 26, 1916, p. 463.

This was the case of a private, aged thirty, partly buried by a mine explosion, and becoming deaf and mute. The onset of mutism and general collapse was delayed until admission to hospital. The administration of an anæsthetic within three weeks of the onset of the disorder, while the patient was still in a very shaken state, did no good, but rather aggravated the condition, and caused distress. Speech was restored under the influence of alcohol, and recovery of hearing followed the administration of a general anæsthetic when five months had elapsed and other measures had failed.

Macleod Yearsley.

MISCELLANEOUS.

O'Malley, J. F.—Warfare Neuroses of the Throat and Ear. "Lancet," May 27, 1916, p. 1080.

The author discusses functional aphonia, mutism, loss of volitional coughing, and functional deafness. Of these neuroses aphonia alone is the commonest, aphonia with loss of volitional cough coming next; mutism is still more rare. Deafness alone is rare; but mutism with deafness appears to be the least frequent of all. The laryngeal neuroses which came under O'Malley's care were decidedly more common in the winter and spring, and some gave a history of catarrh at the time of onset. He found that the more pronounced the catarrh, the greater the difficulty in getting patients to phonate properly.

O'Malley discusses the physiology of speech and hearing, and remarks that the nearer a function approaches to a purely reflex act, intended to protect and preserve the animal existence, the less prone is it to neuroses. He gives a summary of 24 illustrative cases, of which 17 were pure aphonia; 4 aphonia with loss of phonatory cough; 1 of mutism, and 2 of mutism with functional deafness. Two cases had bullet wounds of the larynx; one followed "gassing." Ten cases showed laryngeal and tracheal hyperæmia, and eleven showed no evidence of catarrhal trouble at the time of examination.

Treatment is described. That for aphonia is by using a laryngoscope mirror, and, if the vocal cords do not approximate, making moderate friction with it until secretion drops into the larynx, which, acting as a foreign body, starts an involuntary cough. Functional deafness is treated by exciting the vestibular apparatus by syringing with hot or cold water until giddiness is excited. The surgeon then shouts into the ear through a speaking tube.

Macleod Yearsley.

Cameron, Hector Charles.—The Reaction of the Child to a Faulty Environment. "Practitioner," xevii, p. 61.

A most instructive paper, in which the author insists upon the great frequency, among the children of the poor, of catarrhal infections of all

sorts, and that this is due to the evil effects upon the organism of a faulty diet and a faulty environment. The tendency to catarrhal infections is a special characteristic of childhood, and even of healthy childhood. This commonness of catarrhal affections in the children of the poor is such that a considerable percentage show, after death, lymphatic enlargement (save after long illness). Although "status lymphaticus" may be the reason for sudden death without adequate cause being patent *post-mortem*, many such deaths are undoubtedly due to lowered resistance to infection. The author points out that out-patient children, though catarrhal, may often be plump, rounded, and high-coloured. On examination, however, there can be found a host of manifestations indicative of lowered resistance. A second group of children is pale, undersized, and wasted, with intractable secondary dyspepsia, the children who have suffered a constant repetition of catarrhal affections. One paragraph is specially worth quoting: "For some years I have felt convinced that the *post-mortem* appearance, to which the name status lymphaticus has been applied, is found only in children who have exhibited this fictitious appearance of health with persistent, though quiescent, catarrhal infections, and who have met their death without preliminary wasting or de-hydration of the body." No name has yet been given to the conditions thus described by the author, who suggests the expression "catarrhal state." In discussing aetiology, three factors are considered—heredity, faults of hygiene, and faults of diet. Confinement to hot rooms and a town life are important causes. Air-borne respiratory infections are very common, even in hospitals, and something is said as to the evils of the "hospitalising" of infants. Among faults of diet, artificial feeding and excess of one constituent (generally sugar or starch) in the food are prominent. In conclusion, attention is drawn to the relation between the catarrhal state and rheumatism and tuberculosis.

Macleod Yearsley.

Cameron, H. C.—Osteogenesis Imperfecta. "Proceedings of Royal Society of Medicine." Section, Disease in Children, p. 43, April, 1916.

The exhibitor brings forward one or two points in connection with osteogenesis imperfecta—none of them perhaps of the first importance, but some of them novel.

The shape of the skull in the case shown, viz. a child, aged five months, was typical of the disorder. The bones of the skull generally were very thin, and in many places yielded on pressure. The ossification was most defective in the lateral parts of the skull, which was formed largely in membrane, making persistent lateral fontanelles of considerable size.

In the temporal region, only marked on the left side, there was a bulging outwards above the ear, the apex of which was displaced a little downwards.

In osteogenesis imperfecta, properly so called, we have to deal with a condition characterised not only by deficient ossification and fragility of the long bones, but also by a typical and peculiar formation of the skull. The exhibitor believes that the condition has in the past been generally confused with hydrocephalus.

In later childhood, in cases in which life was prolonged, the most striking characteristic is a marked bulging in the temporal region sufficient to turn over the upper part of the ear. *Archer Ryland.*

REVIEWS.

The City of Din: A Tirade against Noise. By DAN MCKENZIE, M.D.Glasg., F.R.C.S.Ed. London: Adlard & Son, 1916.

It has been said that easy writing is "damned hard reading," and if the converse is equally true that easy reading is "damned hard writing" Dr. Dan McKenzie's task in preparing the present work must indeed have been a severe one. Whatever opinions may be held as to the significance, the reasonableness, or the usefulness of this production, there can be only unanimity as to its being a model of readableness. At the first view it suggests having been written *currente calamo*, but we know that the *currente calamo* method cannot long be kept up without defects in diction or thought showing themselves. We venture to think that Dr. McKenzie's art has succeeded admirably in concealing itself, and that only laborious revision and retouching could have effected the finished result he offers us.

A tirade against noise is more or less an emphatic assertion of the obvious, and the cold facts and arguments adduced might no doubt have been put in fewer words, but the reading world would have been a loser if Dr. McKenzie's contentions, and, above all, his interesting discursions, had been cut down. Many of us know his skill in dialectics, especially when supporting a case which he knows some of his hearers consider a weak one. In the present instance, however, the audience is entirely with him, and he is at his best, and how good that best is will be heartily acknowledged by every reader.

Many passages will appeal to the fancy, but the discursion (it is too cognate to the subject to be considered a digression) on the power of the brain to close the door on unpleasant sensations (p. 50) seems a peculiarly happy one. The remarks on music as a nuisance, with quotations from Sir Thomas Beecham, the Prince von Hohenlohe and others, are singularly trenchant. (The writer might have added a quotation from Munro in regard to a performance of "My Rosary" in a fashionable restaurant at the moment when one of the *chef de cuisine's* finest creations in the form of a soup was served out. The music arrested the attention of all, and the soup was allowed to cool untasted in the plates. Under the circumstances the culinary artist could find no vent for his feelings short of dipping the musical conductor's bowing head in the soup tureen.) Another interesting discursion is the one on the different varieties of tiredness, finishing up with the train-tiredness, which he attributes mainly to the long bombardment of the auditory nerve-centres by the noises produced by the train, and which tiredness is surprisingly reduced if the ears are stopped with some material more or less impenetrable by the louder sounds (pp. 74-79).

The reviewer having read the "Litany of Din," and having found among the many forms of it from which the writer prays to be delivered,

"The damning praise of loud-voiced fools"

and

"The fearful croak of senile truth,"

feels he ought here to bring his remarks to a close.

Dundas Grant.

The Medical Annual: A Year Book of Treatment and Practitioners' Index. 1916 (thirty-fourth year). Bristol: John Wright & Sons, Ltd.; London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd.; New York: William Wood & Co.; Toronto: The J. F. Hartz Co., Ltd.; Calcutta: Thacker, Spink & Co.; Butterworth & Co. (India), Ltd.; Bombay: Thacker & Co., Ltd.; Melbourne, Sydney, Adelaide, and Brisbane: G. Robertson & Co. Proprietary, Ltd.; Sydney: Angus & Robertson, Ltd.; New Zealand: Whitcombe & Tombs, Ltd.

"The Medical Annual" affords the amount of engrossing reading which we are accustomed to find in it, and perhaps even more than usual. The general portions—that is those which are not concerned with the throat, nose, or ear—are full of interest, and the special ones certainly contain many new things. It is probably unfamiliar to many of us that there is a form of tonsillitis due to amœbiasis (p. 18), and intractable to the ordinary treatment of tonsillitis, but yielding to emetine. Emetine is also recommended for hæmorrhage following nasopharyngeal operations. Again, the antiseptic action of basic aniline dyes, as compared with the acid ones, is said to be shown by the efficacy of local applications of a solution of Dahlin in streptococcic infections of the throat (p. 15). The use of X rays in the diagnosis of disease of the cartilages of the larynx and of the presence of calculi in the salivary gland is referred to. War injuries of the nose, throat, and ear occupy a considerable amount of space, and the copious and judicious abstracting of Dr. J. S. Fraser makes this very instructive reading. The diagnosis of simulated, exaggerated, functional and organic deafness is fraught with much difficulty, and it is to be hoped that careful sifting of evidence accumulated since this issue will remove some of the difficulty in the near future. The recent literature on "noise-deafness" and tuberculosis of the ear is admirably dealt with by the same abstractor. Ramsay Hunt deals with diseases of the cerebellum, quoting largely from Sir Wm. Milligan's paper on "Cerebellar Abscesses" (p. 164), advocating exploration through the posterior antral wall, internal to the lateral sinus, combined frequently with a counter-drainage behind the groove for the sinus. The description of the "symptom-complex" produced by occlusion of the posterior inferior cerebellar artery seems very clear-cut (p. 166). Altogether the present volume keeps up the reputation of the work and makes it an indispensable annual help.

Dundas Grant.

CORRESPONDENCE.

To the Editor of THE JOURNAL OF LARYNGOLOGY, RHINOLOGY, AND OTOTOLOGY.

SIR,—I have to thank Dr. McBride for his kind expressions. My best reply to his letter will be to publish in full my views upon this matter, with illustrative cases, and this I hope to do as soon as possible.

At the same time, I believe it is quite legitimate to formulate an hypothesis and then try to work it out. I have some sort of dim idea that many things which are now accepted truths have been started in this way.

October 21, 1916.

Yours truly,
MACLEOD YEARSLEY.

BOOKS RECEIVED.

Archivio Italiano di Otologia. III and IV Fascicoli. Vol. xxvii, 1916.
University of Iowa Monographs: Studies in Medicine. Vol. i, No. 1.

THE
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**CONTRIBUTION TO THE ETIOLOGY AND PATHOGENESIS
OF OTOGENIC SINUSPHLEBITIS.**

BY HOLGER MYGIND, M.D.,
Copenhagen.

THE present paper is based upon the observation of seventy cases of otogenic sinusphlebitis operated on by myself in the Oto-Laryngological Department of the Copenhagen Kommunehospital during the last ten years. This material is, I believe, the largest personally observed as yet published (Körner, *Die otit. Erkrank. d. Hirus, etc.*, 1902, p. 79).

Otogenic sinusphlebitis has, however, been observed more frequently than in the above-mentioned seventy cases in my department of the hospital, as this disease, besides in the cases operated upon, has been found in some cases at the *post-mortem* examination of patients who died from other intracranial complications of ear disease, but in whom the sinusphlebitis was either not diagnosed *in vivo* or not operated on.

The seventy cases may be divided into the following classes according to sex and age (for table see p. 498).

SEX.

My material shows that otogenic sinusphlebitis appears more frequently in males than in females. This difference is more pronounced than it appears from the figures (respectively 37 and 33), as the female population is in Denmark, as nearly everywhere,

numerically stronger than the male (in Denmark with about 3 per cent.).

The statistical figures given by Körner (*op. cit.* p. 79) show a still larger percentage of males attacked by otogenic sinusphlebitis, the disease appearing, according to his figures, with more than double frequency amongst males. Statistics published from America, including 100 patients operated on by different surgeons (Calhoun¹), give a similar result.

SEVENTY OWN CASES OF OTOGENIC SINUSPHLEBITIS OPERATED ON.

Age.	Males.	Females.	Total.	Cured.	Died.
Under 5 years . . .	4	2	6	3	3
5-9 years . . .	10	9	19	13	6
10-14 " . . .	9	13	22	13	9
15-19 " . . .	5	0	5	3	2
20-29 " . . .	5	4	9	7	2
30-39 " . . .	2	4	6	3	3
40-49 " . . .	0	0	0	0	0
50-59 " . . .	1	1	2	0	2
60 years and more .	1	0	1	0	1
Total . . .	37	33	70	42 i.e. 60 %	28 i.e. 40 %

This relation is not so peculiar, as other inflammatory brain diseases appear also with greater frequency in males, for instance epidemic cerebro-spinal meningitis. I have also proved this to be the case with otogenic meningitis.

There is, therefore, reason to believe that the male brain is more susceptible to inflammatory disease than the female.

AGE.

My statistics given above show a very considerable number of children attacked. About two-thirds of the patients operated on were under fifteen years of age, although this class of age only embraces one-third of the entire population.

Both Hessler and Körner have also found a numerical superiority of childhood in otogenic sinusphlebitis. As both these authors, however, divide their figures in classes of age of 1-10 and 10-40 years, no comparison can be made.

There is also in this aspect a similarity between otogenic sinus-

¹ Calhoun: Report of One Hundred Cases of Sinus thrombosis, 1912. In what periodical this paper is published I do not know, as I only possess a reprint, kindly sent to me by the author.

phlebitis and otogenic meningitis, as my own experience has taught me that nearly one-half of the individuals attacked by the latter disease are children. There is, however, a difference in infancy, for while I have operated on four children under one year of age among sixty-eight patients with otogenic meningitis, I have not as yet come across a single case of otogenic sinusphlebitis in a child under one year of age. The American statistics quoted above show only two children under one year of age attacked by otogenic sinusphlebitis among 100 cases.

As these American statistics published by Calhoun are not much known and are of value, I shall publish an extract from them for comparison with mine :

CALHOUN'S STATISTICS OF A HUNDRED CASES OF OTOGENIC SINUS-PHLEBITIS OPERATED ON BY SEVERAL SURGEONS.

Age.	Males.	Females.	Total.	Cured.	Died.
Under 5 years . . .	9	5	14	8	6
5-9 years . . .	12	6	18	13	15
10-14 " . . .	9	3	12	6	6
15-19 " . . .	9	8	17	10	7
20-29 " . . .	13	6	19	9	10
30-39 " . . .	4	2	6	2	4
40-49 " . . .	6	3	9	4	5
50-59 " . . .	3	0	3	0	3
60 years and over . .	1	0	1	1	0
Uncertain . . .	0	1	1	0	1
Total . . .	66	34	100	53	47

It will also be seen from both tables of statistics that the otogenic thrombophlebitis appears very rarely after the age of sixty years, this class appearing in both, with but one case.

THE PRIMARY MIDDLE-EAR SUPPURATION.

Körner stated at first that the primary suppuration of the middle ear causing sinusphlebitis was chronic in the majority of cases. In an appendix to his work quoted several times here. Körner, however, has come to the conclusion that recent authors seem to agree that the primary otitis most frequently is acute.

My material shows that the primary ear disease was chronic in 40 cases, *i. e.* in 57.1 per cent. of all cases, and acute in 30, *i. e.*, 42.9 per cent. The statistics published by Calhoun show almost

the same figures, viz., 58.0 and 41.0 per cent. (while 1 per cent. was uncertain).

According to these figures there does not seem to be any reason to attach any importance to either one or the other form of the primary ear inflammation as an etiological factor of sinusphlebitis. It is not improbable either that the frequency of acute middle-ear inflammation as a cause of sinusphlebitis varies in accordance with different epidemic influences. The relation might, then, be either that acute middle-ear inflammation is more frequent at some periods according to the frequency and character of various epidemic diseases (especially angina and influenza), or that the ear diseases in some epidemics are more inclined to be combined with sinusphlebitis. I have, anyhow, observed that this otogenic complication appears in my hospital department with comparatively great frequency at some periods, while it does not appear at all at others even of longer duration. My experience is also that this intracranial complication is at certain periods more malignant than at others—exactly the same as I have observed concerning otogenic meningitis.

Körner has pointed out that otogenic sinusphlebitis is—like other otogenic intracranial complications—more frequently produced from the right ear. Körner explains this by the fact that the right sigmoid sinus is situated more profoundly—on an average 1.05 mm.—on the right side. Other authors have confirmed Körner's statement, that of suppuration of the right ear more frequently causing infection of the sigmoid sinus. In my patients there was also a preponderance of the right side, but the difference was not nearly as considerable as that stated by other authors, the figures for the right and the left side only being respectively 36 and 34.

Körner also says that "the primary disease of the ear and the temporal bone nearly always attacks the bony tissue" (*op. cit.* p. 80). In my patients I also found the bone most frequently attacked. In five, however, *i. e.* in 9 per cent. of the cases, the inflammation of the middle ear did not spread outside the walls of the mastoid antrum. In a few other cases there was not as yet any visible bony destruction of the mastoid process, the inflammatory products being only represented by the formation of pus and granulations in the cells of the mastoid process. In some cases the bony destruction found was very limited.

There is, therefore, reason to believe that in not a few cases there is not any relation between the intensity of the primary

inflammatory process of the ear and the secondary grave complication.

As to the point of time at which the sinusphlebitis generally develops during the primary acute middle-ear suppuration, the following data may be given :

	Days.	Cases.
Duration of suppuration . . .	4-7 .	5
" " . . .	7-14 .	6
" " . . .	14-21 .	8
" " . . .	21-28 .	6
" " . . .	over 28 .	3

It seems according to these figures that the sinusphlebitis caused by acute middle-ear disease does not appear with any special frequency during a certain period of the primary disease. It is especially noteworthy that this serious otogenic complication can appear very early during the course of acute middle-ear inflammation.

As far as the chronic middle-ear inflammation is concerned, my material shows that in twenty-three out of forty cases, *i. e.* in over half of these, it was of cholesteatomatous nature.

In the majority of our cases the cause of the middle-ear suppuration was unknown. In several of the patients there was, however, on their admittance to the hospital an *angina* present, which in many cases undoubtedly was the cause of the acute suppuration or the exacerbation of the chronic. In accordance with the latter fact an acute osteitis was also found, together with the chronic osteitis present. In some cases *influenza* was undoubtedly the cause.

The primary disease of the bone was, as stated before, in several cases either very slightly pronounced or could not be seen by the naked eye. In the majority of cases it was, however, very pronounced and had spread far beyond the mastoid antrum, and in many of these cases a propagation of the inflammation from the bone to the sigmoid sinus *per continuitatem* could be distinctly traced. In thirty cases there was, however, no anomaly whatever of the body-wall of the sulcus sigmoideus.

Although the disease of the bone was so very marked in the majority of cases there were, on the other hand, several where the mastoid region exhibited a perfectly normal external appearance. In sixteen cases there was neither swelling nor tenderness of the mastoid region. This fact is in accordance with what I have pointed out in several of my papers on otogenic meningitis as

existing also in this intracranial disease, and the surgeon who waits to operate until there is swelling or tenderness of the mastoid region will, therefore, often come too late.

It remains to point out that otogenic sinusphlebitis can appear after the primary acute inflammation of the tympanic cavity has ceased entirely or almost entirely—a fact which A. Voss has put great stress upon.¹ I have observed this in three patients. That the diagnosis in such cases may be very difficult the following case will illustrate :

CASE 1.—A man, aged thirty-four (Case No. 379, 1914), was admitted to the Hospital August 28th, 1914. Pains in the left ear four weeks previously after sea-bathing; three weeks ago incision of the left drumhead was performed, after which a discharge appeared for eight to ten days, and three days before admission pains under the left ear and in the left side of the neck. Two days ago the patient vomited once; slight febrilia without rigors.

When the patient was admitted the temperature was 38° C. *Left ear:* Retraction of the drumhead, with injection along the manubrium mallei. *Left mastoid region:* Doubtful infiltration, no tenderness. Whispering heard with left ear 0.50 m. from the ear.

The patient kept his bed until September 3rd, 1914, the temperature sometimes being normal for twenty-four hours and sometimes slightly raised; a few times it rose higher. On September 3rd, 1914, the following note was taken: Although the drumhead exhibits very small anomalies and the mastoid region is but very slightly swollen, with no tenderness, there must be a slight suspicion of thrombophlebitis, and *resection of the mastoid process* is, therefore, performed. A large perisinous abscess is found and a considerable epiphlebitis, besides a well-developed acute osteitis of the mastoid process. Puncture of the perpendicular portion of the sigmoid sinus is then performed, with the result that fluid blood is found in the upper part and pus in the lower part. By incision of the sinus a thrombus is found, which is partly organised; above it is fluid blood, and lower down pus is found. Finally, *ligature of the internal jugular vein* is performed.

A continual pyemic fever now appeared, the temperature rising, however, seldom very high. Neuritis optica in both eyes appeared. On October 9th, 1914, i.e. more than a month after the first operation, infiltration and tenderness of the opposite mastoid region appeared, while the corresponding drumhead only showed a slight transparent redness. *Resection of the right mastoid process* was now performed, with the result that a moderately acute osteitis was found; the sigmoid sinus appeared normal, but pus was found by puncture of the sinus. The sinus was now opened by incision, and, lastly, *ligature also of the right internal jugular vein* was performed.

The general condition of the patient remained tolerably good all the time, but at last meningitis set in, and the patient died.

At the *post-mortem* examination a diffuse purulent meningitis was found; besides, both sinus transversi and most of the other cerebral sinus were found filled with pus.

Forms of Bacteria.—The thrombus, or in cases where no

¹ *Zeitsch. f. Ohrenheilk.*, Bd. 33, p. 42.

thrombus was formed, the blood from the sinus taken by puncture or incision was, from different reasons, not examined bacteriologically in fourteen of over seventy cases. In the remaining fifty-six a bacteriological examination was performed in the Pathological Institute of the Communehospital, with the result that the thrombus was found sterile in nineteen cases and the blood sterile in two where no thrombus was discovered. That the blood was found sterile in the latter two cases cannot be wondered at, considering the well-known fact that the blood can—at least for periods—be found sterile even in cases of fully-developed otogenic sepsis. It is, on the other hand, surprising that the thrombus is found sterile in so many cases; it must, however, be remembered that it often is only a small part of the thrombus which is removed and examined, and that it is often situated at some distance from the primary formation of the blood-clot, and lastly, that several circumstances speak in favour of the view that the thrombus is only infected secondarily.

Streptococci.—Simmonds has, by examining 1200 cases of sepsis in general, found streptococci in 63 per cent. of these.¹ In my cases, in which the examination of the thrombus or the blood gave a positive result (altogether thirty-five), streptococci were only found in fourteen, *i. e.* 40 per cent. Of these, streptococci were found in pure culture in ten; twice streptococci and staphylococci, and twice streptococci and other undefinable bacteria were found.

According to these results it would seem that otogenic sepsis is more rarely caused by infection with streptococci than other forms of sepsis, although inflammation of the middle ear is most frequently caused by these forms of bacteria. There can, however, be no doubt that several more of my cases of thrombophlebitis were really caused by streptococci, considering the fact that streptococci were found in the pus of the mastoid process in seven of the cases where either no examination was made of the thrombus or the blood, or where the result of this examination was negative. The percentage might then, in reality, be about fifty. It must, however, be remembered that it is not rare to find different bacteria in the primary focus on the one side, and in the thrombus and the blood of the sigmoid sinus on the other side. I have also, in one case, found different bacteria in the exudation of the serous cavities on the one side, and in the thrombus on the other side.

¹ Jochmann, *Lehrb. d. Infektionskrankh.*, 1914, s. 100.

There can, however, be no doubt that infection with streptococci is by far the most frequent form of otogenic sepsis, although not to the extent urged by Leutert when this author states "that the sinus thrombosis almost exclusively is the domain of the streptococci."¹

Staphylococci.—These were found altogether ten times, but only in three cases in pure culture. Twice they were—as stated above—found together with streptococci, and five times together with bacteria of uncertain character. Simmonds found staphylococci as cause of sepsis in general only in six cases of 1200. There seems, therefore, to be some reason to believe that infection from staphylococci is comparatively frequent in otogenic sepsis.

Coli bacilli.—Although this form of bacteria, according to Simmonds, is the cause of sepsis in general in 17 per cent. of all cases, the bacterium coli commune is very little known as cause of otogenic sepsis. It was, therefore, very surprising to learn that it was found in not less than seven of my patients, *i. e.* in 20 per cent. of the cases where the bacterial examination yielded a positive result. In four of these seven cases it was found in pure culture. In one case it was only found in the pus from an epidural abscess complicating the sinusphlebitis.

Pneumococci were only found once (together with another form of bacteria of uncertain character). There were, however, two cases in which the thrombus was not examined in which pneumococci were found in the pus in the mastoid process.

Bacteria of uncertain character were found seven times.

Bacteria in the Cerebro-spinal Fluid.—In no less than forty-two of my seventy patients lumbar puncture was performed, with the following result: Sterile fluid in twenty-nine, fluid containing bacteria in thirteen cases. With one exception (mentioned above), the same bacteria was found in the cerebro-spinal fluid as in the primary disease which had caused the phlebitis. In no less than four cases the cerebro-spinal fluid contained bacteria without exhibiting any other anomaly pointing towards meningitis.

The Perisinous Abscess.—This anomaly plays undoubtedly a very important part as cause of thrombophlebitis of the sigmoid sinus, as it was found by the operation in not less than forty-three cases, *i. e.* 50 per cent.

It is easily understood that a sinus which is surrounded by pus gets infected, especially when the wall of the sinus is exposed to pressure from it. This pressure is often considerable, which may

¹ *Arch. f. Ohrenheilk.*, vol. xlvii, p. 56.

be judged from the fact that the whole sinus is not unfrequently perfectly flattened.

It is not, however, necessary that a perisinous abscess should produce phlebitis. This is illustrated by the fact that, besides the above-mentioned forty cases of thrombophlebitis with perisinous abscess, I have, during the last ten years, observed thirty other cases of perisinous abscess which were not complicated with phlebitis of the sigmoid sinus.

In my cases of sinusphlebitis the perisinous abscess appeared with marked frequency when the primary situation of the middle ear was of chronic nature, viz. in twenty-eight of them, *i. e.* in 70 per cent. In cases of acute middle-ear suppuration the perisinous abscess only appeared fifteen times, *i. e.* in 50 per cent. of these cases. It seems that chronic middle-ear suppuration, complicated with cholesteatomatous inflammation, is a little more frequently the cause of the perisinous abscess (sixteen out of twenty-three cases, *i. e.*, in 74 per cent.).

The Pathogenesis of Sinusphlebitis.—Stenger has found from experiments¹ that the sigmoid sinus of dogs does not become infected when pus is merely applied to the external wall of the sinus. The infection first occurs when the wall is the seat of a lesion.

This applies in all probability also to human beings, and my material shows that in the great majority of cases where perisinous abscess occurred together with sinusphlebitis, there was also a lesion of the wall of the sinus. This lesion consisted generally in the formation of granulations on and in the wall of the sigmoid sinus (thirty-two times out of seventy-three cases of perisinous abscess). This episinuitis, as it is generally termed, may, however, also exist without the formation of pus (seven times in over seventy cases of sinusphlebitis).

By making an incision of the wall of the sigmoid sinus during the operation it is frequently possible to see how the granulations situated on the external surface of the sinus extend also into the depth of the wall, which is then more or less thickened. Now and then it is also possible to see small hæmorrhages between the layers of the wall both by making an incision and also by inspection of the external surface of the sinus. In some cases this inflammation of the wall of the sigmoid sinus results in necrosis, which can be so developed that a perforation or even a greater destruction of the external wall is the result. In such cases the internal surface of

¹ *Verhandl. d. Deutsch. Otol. Gesellsch.*, 1904, p. 111.

the cerebral part of the wall is sometimes exposed. I have observed perforation of the wall of the sigmoid sinus altogether three times; in all these cases the patients were children, and in one the whole external wall of the perpendicular portion of the sigmoid sinus was entirely wanting.

In a minority of cases the sinus appears quite normal. I have, however, in several of these cases obtained a microscopical examination of the wall of the sinus, which in all cases exhibited signs of inflammation. In one of these cases no thrombus was found by the operation.

It is, however, not unlikely that an episinuitis can produce a perisinous abscess and not *vice versa*; my impression was, anyhow in some cases, that the pus found round the sinus was produced by the granulations on the wall of the sinus.

The Pathogenesis of the Thrombus.—How, then, does the inflammation of the wall of the sinus spread and produce a thrombus?

Experiments made by Stenger (*loc. cit.*) and other investigators point out that the pathogenic bacteria spread through the wall produce first a phlebitis and after that a pathological change of the blood, which on this account coagulates and produces a thrombus, which is then secondarily infected.

Although microscopical examination of the wall of the sinus was performed in many of my cases after excision of part of it during operation, my material does not throw any light on the experiments on animals used by Stenger. When, however, Stenger arrives to the result that "so-called parietal thrombi were not observed," this does not apply to human beings, as it is a well-known fact that such are not infrequently found at the surgical autopsy.

I believe parietal thrombi are more frequent than generally believed during the first stage of otogenic thrombophlebitis. I conclude this, because amongst the nine cases in which I found parietal thrombi there were several in which their existence was only discovered by incision of the sinus, while puncture of the sinus had yielded fluid blood. There is, therefore, reason to believe that in some of the cases in which the result of the puncture was negative and in which incision was not performed, a parietal thrombus was present.

The parietal thrombus has in most of my cases appeared as a deposit of layers of clot along the whole circumference of the sinus leaving a stream of blood free in the middle. This stream of

blood was in several cases very fine, but large enough to give blood in the syringe by puncture. In one case it was macroscopically visible that the clot was formed by layers.

It will be seen from this that the diagnostic value of the puncture of the sinus during operation is very conditional. The same applies, however, also to the probatory incision, though not to the same extent. The incision can, namely, only be applied to the sigmoid sinus above the inferior "knee," and the presence of blood does not, therefore, exclude the existence of a bulbar thrombus. The probatory incision, however, less frequently gives rise to mistake than the puncture, and enables a more exact localisation of the clot, which I have frequently found to be the lower part of the perpendicular portion of the sigmoid sinus. The reverse I have only found once.

According to my experience, based especially upon the examination during operation of past cases, the clot generally originates in the lower part of the perpendicular portion of the sigmoid sinus, in the lower horizontal part of the sinus and in the bulb. When originating in the perpendicular portion it is much more inclined to spread downwards than upwards. In not a few cases the clot spreads, however, against the current of the blood, and in the case mentioned as Case No. 1 it will be seen that it even spread beyond the torcular of Herophilus to the opposite transverse sinus, and it is not infrequent to find it during operation reaching $\frac{1}{2}$ to 1 in. beyond the superior flexure of the sigmoid sinus.

I may state here that in thirty-three of my seventy cases bleeding appeared by the removal of the thrombus during operation. In only one case the blood oozed out only from below while in sixteen cases blood only appeared from above. In sixteen other cases blood oozed both from above and below.

My experience confirms the theory of Stenger that the clot in thrombophlebitis is secondarily infected, as of sixty cases, in which the thrombus was examined for bacteria, there were twenty where the thrombus was not yet infected by bacteria, at least in the part which was removed during operation, the examination showing complete sterility. Perhaps the clot formed in the sigmoid sinus remains sterile in many cases which end with recovery without the formation of metastases. In all the cases, however, which ended fatally, the clot was found infected by the *post-mortem* examination and transformed partially or totally into pus.

The character of the thrombus as found by operation will be seen from the following survey :

Thrombus fresh all through	30 times
„ parietal	9 „
„ partially purulent	11 „
„ totally	5 „
„ partially organised	2 „
„ not found	13 „
<hr/>	
Total	70

In one case in which the clot was in a state of organisation upwards, although the symptoms of the phlebitis had only lasted three days, it was fresh downwards. In another case in which the clot was also organised upwards, it was parietal in the middle of the perpendicular portion of the sigmoid sinus and puriform below. In the latter case the symptoms had only lasted for two days. Both patients recovered.

It seems strange that a clot can begin to be organised as early as the second or third day after the first symptoms of phlebitis have appeared. It must, however, be borne in mind, that I have in all cases reckoned as the first day of the disease, the day on which the first rigors or the first symptoms of high fever appeared, and it seems probable that the phlebitis in reality begins earlier, and that the septic fever does not appear until the blood is invaded by bacteria. In the only case I have observed of sinusphlebitis caused by accidental lesion of the sinus,¹ the first rigors did not appear until ten days after the operation. The clot, when the patient was operated upon the next day, only partially filled the sinus, and was besides sterile. The case proved to be a very severe case of streptococci infection, in which, however, recovery ultimately took place in spite of metastases of different sorts, infarct of the lung, etc. (Case 415, 1915). In seven cases of post-operative sinusphlebitis, which I have treated, and which appeared without any lesion of the sinus having taken place during operation, the time between the operation and the beginning of the septic fever was respectively five, six, eight and nine days.

These figures distinctly indicate that otogenic sinusphlebitis

¹ Sinus phlebitis caused by lesion of the sigmoid sinus during operation does not seem, however, according to literature, to be quite rare. Considering, however, that accidental lesion of the sinus not infrequently takes place during operation, there seems reason to believe that the frequency of post-operative sinusphlebitis of this origin is not relatively great. Calhoun states in his paper mentioned above that the sigmoid sinus was accidentally opened thirty times during four hundred cases of mastoid operation, and not in a single case did any infection of the sinus appear

has a latent period, which sometimes is not quite short. The existence of such a latent period explains also a fact I have often had the opportunity of stating, viz., that puriform softening of the clot in sinusphlebitis may appear as early as the second to fifth day after the first rigors.¹ I found as an example partial puriform softening of the thrombus with perforation of the wall of the sinus in a young girl, aged thirteen (Case 96, 1908), on the fourth day after the first rigors. This case was the quickest fatally ending case I have observed as yet, as the patient died so soon as on the third day after the operation from meningitis. The clot in the sinus contained streptococci and staphylococci.

The puriform sloughing of the clot has without exception in my cases been in the most advanced state in the portion of the sinus approaching the bulb, and in several of these cases the clot appeared quite fresh in the upper part of the perpendicular portion of the sigmoid sinus.

The clot formed in the sinus is sometimes thin and flattened, although it fills the interior of the sinus perfectly. This phenomenon is most frequently produced by a perisinous abscess compressing the wall. Exceptionally, it is caused by collapse of the walls without any external pressure. This and the other form of flattening of the sinus can be so considerable that the external wall of the perpendicular portion of the sinus touches the cerebellar wall; neither blood nor clot is then to be seen in this part of the sinus. Care is, therefore, to be exercised in such cases, when probatory puncture or incision is performed, that the brain wall is not perforated. This happened in two of my cases without any complication appearing afterwards.

The flattening of the sigmoid sinus described above is of great practical significance, as it is an absolutely certain proof of the existence of a clot in the sinus, while the inspection and palpation of the sinus often gives no result. Palpation is especially of very small value and ought not to be employed.

There are a few cases reported in literature in which the sigmoid sinus was found partially empty in cases of otogenic thrombophlebitis, although its lumen was patent. I have observed three cases of this kind of "jumping" formation of thrombosis.

¹ Initial rigors frequently did not appear in my patients, viz., in eighteen (26 per cent.), in whom also there was no initial shivering. Of these eighteen, only two were grown-up people. Initial rigor, then, did not appear in about one fourth of the children. More rarely this symptom was wanting during the whole period of the disease (twelve children), and still more rarely in the cases which ended fatally. Of the latter patients only one was grown-up.

In all cases I found a clot in both ends of the spaces and it seems likely that this phenomenon appears when the central part of the clot is formed some time before the peripheral.

The different formations of the clot described above show some interesting details which we miss in the thrombosis of the jugular bulb, which escapes exact examination during operation on account of its deep situation. My material is also defective because I have never have performed an operation on the bulb, as I think the result very doubtful.

I have, however, observed one case of great interest as illustrating the pathology of the thrombosis of the bulb. The case is as follows :

CASE 2.—A boy, aged thirteen (Case 105, 1906), was admitted to the Hospital on December 29th, 1905, with chronic suppuration of the right middle ear, and "radical operation" was performed. During the operation the sigmoid sinus was partially exposed and appeared healthy. Six days later rigors appeared, and the temperature rose. The whole sinus was now exposed and examined, but appeared normal, and probatory puncture yielded blood. A few days later symptoms of infarct of the lung and of meningitis appeared, and the child died five days after the last operation. *Post-mortem* examination was not allowed, but a part of the perpendicular portion of the sigmoid sinus and the bulb were successfully removed after death through this wound. The first-mentioned part appeared quite normal, while the interior part of the bulb was slightly narrowed concentrically by thin layers of clots, which adhered strongly to the walls. The microscope revealed infiltration of the walls of the bulb by round cells, and the elastic tissue was split and partially destroyed; the clot showed commencing necrosis.

This case illustrates well the difficulty of ascertaining the existence of a thrombus when operating, and if recovery had taken place—which undoubtedly happens in not a few cases of thrombosis of the bulb—the case might easily be rubricated under the group of "pyemia without thrombosis."

I shall now proceed to the cases in which no clot was found in the sigmoid sinus and which present great interest.

Sinusphlebitis without Formation of a Clot.—Amongst my patients there were thirteen in which the operation did not reveal the existence of a thrombus in the sigmoid sinus.

In most cases probatory puncture of the sinus with aspiration has been performed alone and a clot has been supposed not to exist when fluid blood has been extracted. The sinus has generally been punctured in two places, one just below the upper flexure of the sinus and one as far downwards towards the bulb as possible; sometimes punctures have been performed in three places. In cases where the puncture revealed blood and the appearance of the

sinus gave rise to doubt as to the existence of a clot. incision has afterwards been made and I have in this way succeeded in finding a clot in all cases except one. In one case my assistant, who attended the patient while I was absent, performed probatory puncture altogether in five different séances, each time with negative result. The case was the following :

CASE 3.—A boy, aged thirteen (Case 223, 1911), was admitted to the Hospital March 13th, 1911, suffering from chronic suppuration of the middle-ear on the right side. The chief symptoms were pains in the ear, headache, vomiting, and rigors. At 10 p.m. radical operation was performed. The sinus appeared normal, and was punctured in two different places with negative result. As pyemic fever appeared directly after the operation, puncture was repeated on four different days, last time on April 22nd, 1911, each time with the same result. On April 1st, 1911, ligature of the internal jugular vein was performed. At last, on April 22nd, 1911, a puriform thrombus was found in the lower extremity of the upper part of the vein. The patient got metastatic abscesses in the subcutaneous tissue and in the muscles (amongst these in the psoas) and a purulent arthritis in the right knee, but recovered at last, after having been in the Hospital for 129 days.

By closer investigation of these thirteen cases, in which no thrombus was found at the operation, they might be divided into two groups—four containing patients who died and nine in whom recovery took place.

Of the four patients who died, one was the boy aged thirteen, mentioned above as Case 2, in whom a partial formation of thrombosis was found in the bulb by the *post-mortem* examination. In a boy, aged one and three-quarters (Case 325, 1911), inflammation of a part of the wall of the sinus excised for microscopical examination was found, and by a *post-mortem* examination twelve days later extensive purulent thrombosis of the transverse and the cavernous sinus. The third patient who died was a man, aged sixty-eight (Case 269, 1914); no thrombus was found by incision, but an empty space in the perpendicular portion of the sigmoid sinus pointing distinctly towards the existence of a clot above and below; bleeding appeared also when the sharp spoon was applied in the cavity of the sinus in both directions; by the *post-mortem* examination an extensive adherent clot was found, and the wall of the sinus showed marked signs of inflammation under microscopical examination. The fourth patient who died was a girl, aged seven (Case 279, 1914), in whom excision of the sinus performed during operation did not reveal the existence of a clot; she died twenty days later, and by the *post-mortem* examination pus was found in nearly all the cerebral tissues.

In these four patients in whom no clot was found during

operation and who died there was, then, really a thrombophlebitis present, and much speaks in favour of the supposition that the primary thrombus was seated in the jugular bulb, but had not yet, at the time of operation, reached the sigmoid sinus except in the man aged sixty-eight, who presents a typical specimen of the form of thrombosis called "jumping thrombosis," mentioned above.

The nine patients in whom also no thrombus was found, but who recovered, may be divided into two subdivisions, one consisting of two, in whom no complications appeared, and one of seven, in whom the phlebitis was complicated. In the first subdivision containing two patients, respectively two years (Case 180, 1915), in whom the blood of the sinus was found sterile, and eighteen years (Case 238, 1912), with streptococci in the blood of the sinus, recovery took place quickly (respectively nineteen and twenty-six days) without any complication appearing.

In the other subdivision, consisting of seven cases, complications appeared. A woman, aged twenty (Case 109, 1900), in whom coli bacilli were found in the pus of an epidural abscess while the blood of the sinus was sterile, got abscess and gangrene of the lung. In a woman, aged thirty-six (Case 415, 1915), with streptococci in the blood of the sinus, abscess of the lung, empyema, and probably also infarct of the spleen, appeared. The remaining five were all children, in whom metastases in the joints and the muscles appeared. The first patient was the boy mentioned under Case 3, in whom streptococci were found in the blood of the sinus; the second was a girl, aged ten (Case 338, 1911), in whom also streptococci were present in the blood of the sinus; the third was a girl, aged eight (Case 56, 1912), who, like the former patient, got a post-operative phlebitis, in whom streptococci were found in the pus of the mastoid process (the blood not examined); the fourth, a girl, aged six (Case 65, 1916), with granulations and diplococci in the blood of the sinus; and the fifth, a boy, aged ten (Case 115, 1916), with sterile blood in the sinus.

These five cases, which all concerned children, are exactly like the cases described by Körner as cases of *otogenic pyemia without sinusphlebitis* or *osteophlebitis pyemia*. They are, according to this author, characterised by (1) absence of clot in the sinus; (2) metastases in joints, bursæ mucosæ, muscles, etc.; (3) attacking principally children and young individuals; and (4) by their favourable prognosis (up to 97 per cent. of cases recovered). While Körner, however, states that these cases are always caused by acute

inflammation of the middle ear, chronic suppuration was the cause in three of my cases, of which, however, one was past operation.

According to my experience, Körner is perfectly entitled to describe such a *clinical* form, but I must add that these five cases cannot be included in it.

First of all, distinct forms of thrombophlebitis can exhibit exactly the same clinical appearance, and it seems unlikely that two essentially different pathological conditions should give exactly the same clinical manifestations. Thus, seven out of all my patients, in whom a genuine thrombophlebitis was revealed by the operation, exhibited exactly the same sort of metastases in joints, bursæ mucosæ, muscles, etc., and also recovered. I have altogether never as yet seen a case of metastases in joints, or bursæ, or muscles, etc., which ended fatally.¹ All these seven patients were also children or young people, their ages being respectively six, seven, eight, eleven, eighteen, twenty-eight, and thirty.

Further, the two above-mentioned women, respectively twenty and thirty-six years old (cases 109, 1905 and 415, 1916), in whom no clot was found in the sinus during operation, nevertheless got complications characteristic for the formation of a thrombus: infarcts in the lungs, and in one there was very likely infarct in the spleen.

Finally, the *post-mortem* examination of the above-mentioned four patients who died showed that three of them had more or less extensively diffused purulent thrombosis of the sigmoid and the adjacent sinus, while the fourth had a partial thrombosis of the jugular bulb.

The objection may be raised against the three cases just mentioned that the thrombophlebitis found by the *post-mortem* examination was the result of the operation performed on the sigmoid sinus.

It must, however, be remarked that the microscopical examination of the excised portion of the sinus in the boy aged thirteen (case 325, 1911) revealed the existence of a phlebitis present at the time of the operation, and that a thrombus must have been present, as stated before, in the man aged sixty-eight (case 209, 1912), in whom a part of the sinus was found empty. In the third patient, a girl aged seven (case 279, 1914), the possibility can,

¹ I have, however, since this was written observed one such case.

perhaps, not be excluded that the operation performed on the sinns might have caused the thrombophlebitis found by the *post-mortem* examination. There were, however, at the time of the operation all the usual signs of thrombophlebitis present, and, besides, the sigmoid sinus is not, as mentioned before, particularly inclined to be infected by accidental lesions, and, of course, still less so by operation lesions performed on purpose.

Two patients, therefore, only remain, who both recovered, and in both of whom no clot was found in the sinus at the operation, as a possible proof of the existence of otogenic pyemia without thrombosis. Both cases differ, however, from those described by Körner, inasmuch as they did not get any metastases in the joints, bursæ mucosæ, muscles, etc.

I do not intend, however, to argue that otogenic sepsis without the formation of a thrombophlebitis of the sigmoid sinus does not exist. I only want to state that none of my cases speak in favour of the theory of the existence of such cases. The existence of such a form of otogenic sepsis can altogether—as urged from several parts—only be proved by bringing forward a case where a detailed and exact examination (including microscopical investigation) of the sigmoid sinuses and the jugular bulb excludes the existence of a thrombus.

How easily such formation of clot in the sinus might evade attention is proved by Case 2, where the jugular bulb gave passage for blood, the clot only being parietal.

Concluding Remarks.—It will be seen that I have, one time after another, pointed towards the jugular bulb (and the adjacent part of the sigmoid sinus) as a frequent place where otogenic thrombophlebitis starts. This is also proved by the fact mentioned before, that in sixteen out of fifty-three cases in which a clot was found in the sigmoid sinus, no bleeding could be produced by applying the sharp spoon in the direction of the bulb, because there was a clot here, while profuse bleeding issued on applying the sharp spoon in the opposite direction.

I, therefore, agree with Jansen, who, when speaking about otogenic thrombophlebitis at the meeting of the German Otological Society at Breslau in 1901, expressed the opinion that the jugular bulb plays an important part as place of origin of thrombophlebitis. When Jansen, however, adds that this only applies to the thrombophlebitis caused by acute middle-ear inflammation, I must state that my experience goes in the opposite direction, as the majority of my cases, where the jugular bulb probably or certainly

was the primary place, were caused by chronic middle-ear suppuration, and most frequently by cholesteatomatous inflammation.

This leads naturally to the idea that also in cases where no thrombus is found by operation there is a formation of clot in the bulb. The fact that a majority of my cases of this class were of a more benign form speaks apparently against this theory, as the thrombophlebitis of the jugular bulb is frequently of a more malign character. I have, however, observed several cases of evident thrombosis of the bulb take a very favourable course.

According to my personal experience I am, therefore, inclined to take up the position that *the otogenic sepsis is a pathogenic unity, which—perhaps with a very few exceptions—is caused by a thrombophlebitis of the sigmoid sinus, or of the bulb, or of both united.* This position leads to sequences of practical significance as to the operation treatment, as I hope to have the opportunity of pointing out later.

CHOANAL POLYPUS.

BY W. S. SYME, M.D., F.R.S.E.

Extra-Academical Lecturer on Diseases of the Throat and Nose, Glasgow ;
Assistant Surgeon, Ear, Nose, and Throat Hospital, Glasgow, etc.

It has seemed to the writer that a more extended experience of these growths renders it necessary for us to reconsider certain views which have been accepted concerning the method of their production and the signs associated with them.

It was formerly held—I do not know if it is still held—that for their production an accessory antro-nasal ostium situated posteriorly to the usual ostium is necessary ; or, in other words, that the pedicle of the polypus can be traced through an accessory ostium to its origin in the lining of the antrum. There is no doubt, of course, that in some cases such an accessory opening has been found, and one can readily understand that an opening in the recess formed by the posterior wall of the antrum with the antro-nasal wall would be a very convenient exit for a polypoidal thickening of the lining membrane in this region, a frequent site, moreover, for this diseased condition. In the majority of cases, however, no such accessory opening exists. The polypus arises in the neighbourhood of the ordinary ostium, enlarged, it may be, and finds its way through it to the middle meatus where the configuration of this passage, the air current, and the effect of gravity

in the lying position determine its gradual passage to the posterior naris. Here it attains its usual, but not invariable, spherical shape.

Every polypus which, arising in the antrum, passes into the middle meatus, does not, of course, find its way to the posterior naris, or, stated differently, all antro-nasal polypi are not antro-choanal. It is not unusual to find antro-choanal polypi associated with antro-nasal polypi. Two very good instances of this association have just come under my observation. In one case, a girl of twelve, a polypus had been removed, not by a specialist, on several occasions from the left nostril. When seen, the left posterior naris was obstructed by a very good specimen of choanal polypus, and there were small polypi in the anterior part of the middle meatus. The antrum was operated on by way of the canine fossæ. The choanal and nasal polypi were found to arise from one stem which had its origin on the antral side of the ordinary ostium. In the second case, that of a woman, polypi had also been removed on several occasions from the nostril, the right. Polypi were found in the anterior part of the nose, and there was also a distinct choanal polypus. On lavage, a clear straw-coloured fluid was evacuated from the right antrum. (The presence of such a fluid is not confined to antro-choanal polypi, however). The polypi were removed, four in number, and each with a long thin pedicle. The antro-nasal ostium, very large in size, was then seen. There appeared to be complete absence of the membrane closing the nasal side of the maxilla, an anomaly which I do not remember to have observed or seen reported before. It was possible to look, without difficulty, into the antral cavity, the glistening posterior wall being distinctly seen. The antrum was opened by the canine route. Further degenerated lining membrane was found, but it was easy to demonstrate the position on the antral side of the lower border of the large ostium from which the polypi had sprung.

All choanal polypi are not antro-choanal. This, of course, is not an original observation. There is no reason why a choanal polypus should not take its origin from any of the accessory cavities, especially from those of the posterior group. At one of the meetings of the Scottish Otological and Laryngological Society I showed a specimen of spheno-choanal polypus which was traced to its origin just on the inner side of the edge of the sphenoidal ostium. By the way, though I have not infrequently removed actual polypi from the sphenoidal sinus, it has been my experience that their presence in the sphenoidal sinus is not nearly so common

as in disease of the maxillary antrum. No doubt the structure of the lining membrane of the sinus accounts for this, as it does for the proportionately less discharge found in this cavity in cases of sphenoidal sinus disease.

Another accepted view with regard to antro-choanal polypus with which I find myself in disagreement is that in most instances evidence of antral disease is absent. In most of my cases, certainly, lavage has given a positive result. It is, of course, conceivable that the change in the antral lining membrane may be limited to the site from which the thin pedicle of the polypus arises, as it is also possible that what is taken to be an antro-choanal polypus is in reality an ethmoido-choanal polypus. One might, I think, go the length of stating that almost invariably, sooner or later, lavage of a sinus from which an antro-choanal polypus has had its origin will give a definitely positive result. Transillumination in this as in what is commonly understood as antral disease, is of very minor value. It is really a question of degree of change in the lining membrane. I have operated on antral cavities associated with antro-choanal polypi which showed changes in the lining membrane varying in degree from that limited to the neighbourhood of the opening into the nose up to complete polypoidal degeneration. Removal of the choanal polypus may or may not be followed later by return of a choanal polypus. In most cases, at any rate, the actual antral disease will manifest itself and require treatment. It is, therefore, a sound rule that antro-choanal polypus should be treated by operation on the antral cavity by way of the canine fossa.

Perhaps I may here be permitted to describe the technique for local anæsthesia which I make use of in operating on the maxillary sinus. Apart from dispensing with general anæsthesia it has the advantage that the operation is almost bloodless and a careful inspection of the antral cavity is easily made, and, moreover, the operation takes much less time. The sinus is washed out by way of the inferior meatus, and then dried in the usual way by means of the air bag. Twenty minims of a 15 or 20 per cent. solution of cocaine, with the addition of 6 or 7 minims of 1 in 1000 adrenalin solution are then injected through the canula by a hypodermic syringe and a little air blown in to spread the solution over the lining membrane. The anterior part of the inferior turbinate and inferior meatus is anæsthetised by means of pledgets of cotton wool soaked in the same solution. The region of the canine fossa is then anæsthetised. For this purpose I formerly used alypin or

Novocaine in 2 per cent. solution in normal saline with the addition of adrenalin. Lately I have used 1 per cent. cocaine. The mucous membrane and soft structures are injected and the injection should be carried down to the bone. In nervous patients a hypodermic injection of morphia, omnopon, or some such drug is sometimes given an hour or half an hour before, but it has been noticed that it tends to cause sickness during or after the operation. Even when it is decided to use general anaesthesia I am in the habit of treating the nose and antral cavity in the way just described, though I refrain from the injection in the canine region. We are all in the habit of combining the local application of cocaine and adrenalin to the nasal mucous membrane with general anaesthesia, so that there does not appear to be more danger in injecting them into the antrum, which is only a local application. Injection under the mucous membrane is in another category and is probably not without danger when combined with general anaesthesia.

CLINICAL NOTES.

A CASE OF HERPES ZOSTER OTICUS.

BY CAPTAIN ARCHER RYLAND, F.R.C.S.E., R.A.M.C.

THE following notes are those of a case of herpes zoster oticus, admitted to the Cambridge Hospital, Aldershot, on June 8th, 1916.

The patient made the following complaints with regard to his condition :

1. Pain inside the left ear.
2. Aching pain and swelling of the left ear itself.
3. Slight deafness in the left ear, but no discharge.
4. Weakness of the left side of the face.
5. A sore feeling down the left side of the throat, and pain on swallowing.
6. Weakness and watering of the left eye.
7. Giddiness. Objects seemed to him to be rotating from his left to his right.

As the result of a careful interrogation it was elicited from the patient that the seizure started with a "cold in the head," and that the symptoms followed one another in rapid succession, appearing actually in the following order :

1. Pain at the left side of the throat.
2. Pain and throbbing inside the ear.
3. Burning pain, swelling, oedema, and livid discoloration of the pinna.
4. Appearance of herpetic vesicles on the floor and posterior wall of the left cartilaginous meatus.

5. Appearance of similar vesicles in the skin over the upper fourth of the sterno-mastoid muscle.

6. Left facial paralysis.

7. Vertigo and nausea.

The patient reported sick on account of painful throbbing inside the ear. The facial paralysis appeared twenty-four hours afterwards.

On admission he appeared to be very ill. The temperature was sub-normal, and indeed remained so during the whole of the attack. The pulse rate was 54.

He complained chiefly of giddiness and nausea.

On examination of the left ear, the tympanic membrane was found to be intact. The handle of the malleus was red and injected, and so to a less extent were adjacent parts of the membrane. There was no sign of a raised intratympanic pressure. The hearing tests were as follows: Weber lateralised to the left. Schwabach—10. Rinne negative. There was loss only of highest tones on the high tone scale. Impaired audition for low fork tones. The whole of the pinna was red and swollen. The patient stated that in this region he was conscious of diminished cutaneous sensibility. The statement was confirmed by careful tests. That part of herpetic eruption which included the external ear was confined to the floor and posterior wall of the soft meatus, and to the skin of the cavum conchæ.

The Distribution of the Herpes.—Discreet herpetic vesicles were present on the floor, and to a greater extent on the posterior wall of the cartilaginous meatus. Vesicles were also present on the skin overlying the mastoid process. There was a similar slightly marked eruption distributed over the upper fourth of the sterno-mastoid. A few vesicles were observed on the anterior surface of the left posterior faucial pillar. The anterior third of the left half of the tongue presented a few bright red spots, not vesicular. Over this area of the tongue there was some tenderness.

It is seen from the above observations that the following cranial nerves were affected:

Seventh cranial nerve: Left facial paralysis, not quite complete as regards the orbicularis palpebrarum.

Eighth: Impaired audition. No signs (at the time of admission) referable to the vestibular ganglion.

Ninth: Disturbance of common sensation of the anterior third of the left half of the tongue, but no disturbance of taste sensation.

There was no spontaneous nystagmus, abnormality of pupils, or ocular movements, and no affection of the larynx.

The following brief periodic notes record the subsequent conduct of the case:

June 11th (that is, three days after admission).—A spontaneous rotary nystagmus on fixation to the right was now noticed for the first time. Vertigo severe, and vomiting very frequent. The post-aural herpes is beginning to disappear.

June 12th.—The auricle is recovering its normal appearance. The lobule is now natural. The swelling and vascularity appear to be diminishing from below upwards. There is still present a high degree of swelling and livid discoloration. Spontaneous nystagmus still persists. Pain in the throat is much less.

June 14th.—The auricle has recovered, and its cutaneous sensibility is normal. The herpes is clearing up rapidly, but makes least progress in

the meatal skin. The spontaneous nystagmus still faintly persists. The vomiting continues, but is less frequent. Patient still suffers from vertigo. The facial paralysis is unchanged. Leucocytes 8,000 per c.mm.

June 17th.—The vomiting ceased three days ago, and has not returned. He still complains of vertigo. Nystagmus to right can still be plainly elicited. Facial paralysis unchanged.

June 23rd.—There is still some slight vertigo. Spontaneous nystagmus cannot be elicited, and has now ceased after a duration of twelve days.

The patient is now up and about, and the facial paralysis is his only complaint.

July 9th.—The facial paralysis is slowly recovering. There is a moist eczematous patch, the result of the herpes in the concavity of the concha. There is desquamation and *débris* over the surface of the tympanic membrane, but no visible defect of the membrane. There is still some slight deafness of the middle-ear type only.

In conclusion, may the writer be permitted to emphasise separately the outstanding facts of the case? First and foremost comes the alarming resemblance in the first few days of the disease to an acute intracranial complication. At this stage the patient was prostrated, and had the appearance of being very seriously ill.

The herpes itself is the decisive factor in the diagnosis. In this case it made its appearance early, and lasted for eight days. The vomiting for the first three days was intense, frequent, and uncontrollable. It lasted altogether six days. It is a question whether or no this vomiting is really attributable to some ganglionic involvement of the vagus. The spontaneous nystagmus made its appearance on the third day. Its total duration was twelve days. The duration of the herpes was eight days. It followed an auriculo-temporal distribution. Throughout the attack the temperature was subnormal and the pulse slow. The leucocyte count was not raised. The spinal fluid was healthy.

VON BEZOLD'S MASTOIDITIS.

By H. LAWSON WHALE,
Capt. R.A.M.C.(T.).

A SOLDIER was admitted in July, 1916, to No. 13 Stationary Hospital with long-standing right-sided otorrhœa, a tense red swelling from the top of his mastoid down to the middle of the sterno-mastoid muscle, slight paresis of the right orbicularis oris, and moderate pyrexia. At operation no chisels or gouges were used; the outer antral walls, and the bony posterior meatal wall down to and including the facial ridge, were replaced by septic osseous *débris*, which was easily cleared by lightly curetting. The mastoid apex was removed to evacuate pus from the digastric groove and the sterno-mastoid sheath. What had been the antrum and aditus was now a space occupied by a smooth coherent greyish-yellow mass, whose appearance suggested either cholesteatoma or tuberculosis. But it lacked any pearly limiting membrane, and chemically contained no cholesterol; and the microscope showed no evidence of tubercle. The cavity was cleaned and treated as an ordinary Stacké operation; the facial paresis slowly disappeared, and recovery was uneventful, and Capt. C. E. West, to whose care I sent the patient as soon as possible, wrote to tell me that all was well.

The upper part of the cavity had exactly and minutely resembled that of a radical mastoid performed by experienced hands, showing Nature's approval of that proceeding. Findings similar to mine at this operation occur sometimes, but sufficiently rarely, I think, to be worth while reporting.

SOCIETIES' PROCEEDINGS.

PROCEEDINGS OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION.

Niagara Falls, Canada, June 1, 2, 3, 1915.

(Continued from p. 489.)

Observations Upon the Intra-nasal Exenteration of the Ethmoidal Labyrinth in Pansinitis.—**Harris P. Mosher.**—The speaker detailed the fundamental points in the anatomy of the ethmoidal labyrinth, describing the anterior cells, the naso-frontal duct, the unciform cell, the posterior ethmoidal cells, and the superior nasal spine.

After mentioning Hajek's and Ballenger's operation, he then described his own method, as follows: The anterior end of the middle turbinate is first removed. The initial plunge of the curette into the ethmoidal labyrinth is best made by disregarding the agger nasi cell if it is present and going higher on the superior overhang—that is, the extreme upper part of the middle turbinate, and a little further backward. If the curette does not really break into the labyrinth, it should be carried a little higher and a little further back. Finding this point may bother the beginner. Once in the labyrinth the curette is turned and swept forward until it strikes the posterior surface of the ascending process of the superior maxilla. Then it is turned so that it faces posteriorly, and by backward and downward sweeps the unciform process, the ethmoidal bulla and its cells are opened. The cavity so made in the anterior part of the ethmoidal labyrinth is cleared of fragments by using a small round tonsil punch. The operator is now ready to probe for the naso-frontal duct and to enlarge it by sounds, rasps and burr.

In a great majority of instances the ascending process of the superior maxilla is a guide to the naso-frontal duct, so that a probe slipped upward along its posterior border finds the sinus. In the small percentage of cases where this fails the duct can be found by carrying the probe backward to the limit of the roof of the operated cavity and then bringing it forward with the point turned outward. Only as a last resort should the point be turned inward.

The second part of the operation: The head of the patient is held so that the cribriform plate is level, and it is kept so. The curette is now plunged through the attachment of the middle turbinate and carried backward to the outside of the middle and superior turbinates to the front wall of the sphenoidal sinus. This is firm and stops the instrument with a dull and sometimes with a sickening thud. The face of the

curette is now turned downward and the bowl and shaft forced through the bottom of the ethmoidal labyrinth. This generally leaves the posterior half of the middle turbinate dislocated and hanging. The middle is removed by snare or conchotome.

The lower two-thirds of the inner wall have now been removed. The upper third of this wall is left as a prominent antero-posterior ridge, composed in front of the middle turbinate and behind of the superior turbinate. As much of the turbinate ridge as possible should be removed. The amount of the ridge left at the end of the operation determines the thoroughness of the exenteration. Whenever there is an appreciable ridge left there is a chance to remove the inner wall of one or more of the posterior cells. It is especially important to get this remaining portion of the inner wall of the labyrinth removed posteriorly, in order to do away with the inward bulging of the labyrinth which so obscures the nasal face of the front wall of the sphenoidal sinus. For this purpose the round tonsil punch is very convenient. The sinus is now evulsed or laid bare as needed. Finally, the inner surface of the os planum is curetted from behind forward. Packing over night is advisable.

The writer does not consider, that an ethmoidal case is ever free from the liability of a recurrence. While the writer has had no deaths, such have been recorded, and there is always danger in ethmoidal operating. The method of removal of the nasal spine appeals to the writer, provided the anterior ethmoidal cells are dealt with at the same time. In all chronic cases of antral disease the writer prefers opening the canine fossa to the intra-nasal route.

The Frontal Sinus.—Opening it Through the Nose.—Otto T. Freer.—The intra-nasal frontal sinus operation has been developed in the last ten years, and principally by E. F. Ingals, Max Halle, Segura, Vacher, H. P. Mosher, P. Watson Williams, and Herbert Tilley. Freer's article is based upon their work and original observations.

Anatomy.—The frontal sinus outlet or ostium is bounded in front by the crista nasalis interna, internally by the expanded portion of the anterior superior nasal spine of the frontal bone, externally by ethmoid cells lying between the ostium and the lacrymal bone, posteriorly by the anterior ethmoidal cells, which extend from the ostium posteriorly underneath the orbital process of the frontal bone and are completed and roofed by it. Removal of the ethmoidal cells thus forming the portion of the sinus floor behind and external to the ostium, gives a space for drainage greater than that created by cutting away the internal nasal crest forward with rasp or burr, while the opening is more likely to remain permanent. It may, however, be necessary to cut away both the cells and the crest to open the sinus sufficiently.

The Operation.—This usually begins with the severing of the anterior attachment of the middle turbinate or with resection of its anterior half, if necessary. In some cases a projecting middle turbinate may be left intact. If needed the uncinate process is next cut away with the Freer sharp septum elevators to expose the bulla ethmoidalis fully to view. With a ring curette, whose edge is directed forward and obliquely upward and inward against the bottom of the bulla, the bulla is entered and the curette is made to sweep away the anterior ethmoid cells from the bulla forward and upward to the ascending process of the superior maxillary bone, and, if possible, to the sinus floor, breaking through the latter and entering the sinus behind the crista

nasalis interna. If the sinus floor prove too hard to give way to the curette, an especially devised probe curette is passed through the sinus ostium after the way through it has been found by an ordinary probe, and the probe curette is made to cut its way out of the sinus through the ethmoid cells under the orbital plate of the frontal bone, thus enlarging the ostium posteriorly, so that a larger curette of the same form may be passed up into the sinus to clear away all of the cell remnants under the orbital plate and in the pathway down into the nose from the sinus, this pathway lying between the lamina papyracea of the ethmoid bone and its turbinal wall. If necessary, the ostium is enlarged forward also with a straight burr driven by the dental engine. The preference is, however, given to posterior enlargement, because of the tendency to the post-operative formation of obstructing cicatrices in the region of the crista nasalis interna.

It is unsafe to curette inward in enlarging the frontal sinus ostium, as there is danger of entering the cranial cavity through the wall of the fossa olfactoria, especially if a torus olfactorius, as described by L. Onodi, exists.

In cases where the suppuration continues in marked degree after the intra-nasal operation, while the sinus remains open for intra-nasal drainage, the external operation must be resorted to. Where great swelling of the lid, exophthalmos or cerebral symptoms indicate the existence of caries of the sinus wall and progress of the disease beyond it in the form of sinusitis frontalis exulcerans (Killian), the intra-nasal operation should not be attempted.

Chronic Pansinusitis Associated with Systemic Infection.—

George E. Shambaugh.—Both cases occurred in young women. One case was caused by a diseased tooth; the cause of the other case is not clear. In both, every accessory sinus on both sides was involved. Intra-nasal operations succeeded in curing the infection in all the sinuses except the frontal sinuses in one case, while in the other even the frontal sinuses are apparently healed. In one case an attack of acute articular rheumatism occurred, apparently from the focus in the sinuses. The opening of a large posterior ethmoid cell and the neighbouring sphenoid sinus was followed by a disappearance of the rheumatism. In the other case a severe chronic arthritis, involving every joint in the body, occurred as the result of a severe acute articular rheumatism which followed an acute exacerbation of the long-standing sinusitis. This case was subject to recurring attacks of acute exacerbations, associated with fever and increased pain in the joints, until by persistent efforts apparently the last focus of pus in the sinuses was drained. Since the sinusitis has been cured there has been an absence of acute exacerbations, but the inflammatory process in the joints is undergoing fibrous changes, resulting in increased rigidity of the joints.

Dr. HARMON SMITH: I have here an instrument which bears on the treatment of the conditions under discussion. It works along the line of creating a vacuum, and while there is a vacuum, lactic acid bacilli are injected. The syringe is loaded with lactic acid bacilli in a solution of argyrol, enzymol, or any other preparation. By means of the syringe the solution is forced into the sinus. A bicycle pump may be employed to create the vacuum. The instrument can be used at home, and should be employed two or three times a day. Subacute and chronic cases have all improved under this method of treatment.

DR. THOMAS HUBBARD: Referring to Dr. Coffin's method, I have one criticism to offer concerning the actual amount of negative pressure used. The statement that he used so many pounds of negative pressure is absolutely incorrect, because the mucosa will stand not more than four or five pounds. This can be determined exactly if measured by a manometer. Three or four pounds is my experience. There is more or less hæmorrhage from five pounds of negative pressure.

HENRY L. SWAIN: The idea of Dr. Wilson's paper is in line with what I have always held. If the ciliated membrane of the cells can be preserved, better results will be obtained than would otherwise be possible. The less the traumatism the better. I had the pleasure of seeing two of the cases mentioned by Dr. Coffin, and the exhibition of the method on the patient. I learned a great deal from the demonstration. I saw him treat a man into whose nose I could easily see. The patient had lost his septum, and it was possible to see into the sphenoid sinus. Everything was very open and apparently clear. I could see no secretion at all, yet Dr. Coffin got out a tube half full of secretion. It was not only serous matter, but pus as well, and was coloured with iodine which had been introduced two or three days before. In the case of the woman there was some pus along the floor. This was all sucked out. At the present time the right side of the face transilluminates better than the left. The effect of the Bulgarian bacillus will be proved by time. The applicability of the apparatus has been demonstrated. I was called upon to treat a case of acute antrum disease in a man who had a round opening in his septum. By going in on the opposite side I could use small tubes or probes, and could flush out the antrum through the natural opening. I could look in through one nostril, put the tube in, and flush out perfectly well.

JOHN F. BARNHILL: Two years ago I saw Dr. Mosher's specimens and his method of operating at that time, and I have employed the method since, with very good results. The limitations can be well marked out, and that is what makes Dr. Mosher's method safer than some of the others. The Ballenger operation is dangerous unless the bone is soft. Where the bone has been softened by the polypoid masses, and where the cells are filled with polypi, the Ballenger method is excellent. Until the posterior retaining wall is reached the operator is within the field of safety. So, then, we are working within a bony capsule, the limitations of which, unless too diseased, will give the sensation of where we are working. In the absence of these limitations, the Ballenger knife is useful.

CHARLES W. RICHARDSON: In the Mosher operation I have met with one complication, which I am surprised that others have not met—the possibility of entering the antrum. There is danger unless one is very cautious in making the downward stroke.

E. FLETCHER INGALS: The Mosher operation for the ethmoid seems to me in every way desirable. However, it has not appealed to me to leave the middle turbinate body until the end, unless the posterior cells are also involved. I prefer to take off the anterior portion of the middle turbinate, as it gives a better view. In acute cases of frontal sinusitis the Mosher method is admirable for opening up the sinus. The intranasal method of opening the frontal sinus which I devised several years ago has answered my purpose better than any of the methods described, giving 90 per cent. better results in chronic suppurative frontal sinusitis. In acute cases I cannot get the probe in. The instrument which I use is 6 mm. in diameter. I have had four or five cases in which

I could not pass it the whole distance. I would get in half way, and be unable to go farther; I would then pass in the burr. The probe prevents one from doing any harm. If it is merely the frontal sinus that is diseased, this method gives all the opening that is necessary. In 90 per cent. of the cases the patients get well just as rapidly as they would from any of the more severe operations. There is no use, as a rule, in making an opening of more than 2 mm. in diameter.

LEWIS A. COFFIN: I employ a method modified somewhat after that of Mosher. He goes in with a curette, I go in with a chisel. I know by a slight tap whether I am on solid ground. There is a big safety space of about half an inch. I make an up-and-down incision with the chisel, then bear upward toward the median line, and at that point introduce Luc's forceps. I take out all I can. Three bites and I am looking into the sphenoid. There is very little hæmorrhage; I have never had to pack a case. It may be necessary to clean up with angular forceps and curette, but to me this is the easiest way.

WILLIAM E. CASSELBERRY: In the earlier years I employed the Hajek method; of late I have adopted various methods. I have followed Mosher's plan, and I have used Coffin's method, except that in all these methods I first remove the anterior end of the middle turbinate body. That which is left of the turbinal is sufficient as a guide, without having the anterior end in the line of the light and shutting off the view. It has been stated by Watson Williams and others that the upper wall is so rich in lymphatics and blood-vessels that there is danger of the communication of sepsis to the brain. That statement has deterred me several times from making my operation as complete and thorough as I wanted to make it in order to enter the sphenoid. I have also found this turbinal plate very hard and difficult to get through. In certain instances I have felt it almost impossible to get down on a level with the sphenoid wall in order to do the classical Hajek operation and the Mosher operation. I have thus been obliged to leave quite a ridge projecting down.

Dr. WILSON, closing the discussion: We do not know much about the lymphatics of the upper part of the nose; most of our knowledge is theoretic. If we inject the subarachnoid space of the brain we can pass dye into the olfactory nerve. We know that the olfactory nerve is surrounded by lymphatics, but we do not know that by injuring the olfactory nerve we will communicate sepsis to the brain. Anatomists teach that it is dangerous to subject the olfactory nerves which come out from the cribriform plate to injury; further than that we do not know.

Dr. COFFIN: Answering Dr. Hubbard's remarks about the amount of pressure; the gauge is graduated, but how I do not know.

Dr. MOSHER: I am sorry to have added to the nomenclature, but the term "agger nasi" seems to me to be the better for the cell at the ensiform curve than "lacrymal" or "infundibular." The selection of a method of operating upon the ethmoidal labyrinth is a personal matter. The danger of working in the extreme upper and anterior part of the middle terminal has been mentioned by Watson Williams, and also by Freer. The higher one goes the greater the danger. Two patients died from meningitis, as I said in the paper. I do not see why the rasp is more dangerous than the burr. For the last year I have removed the anterior end of the middle turbinal, as a routine procedure. As to opening the antrum, as suggested by Dr. Richardson: The amount of

overhang varies greatly. In extreme cases the overhang in front is great. In many cases of frontal sinuitis the antrum is already infected. One also runs the risk of infecting it by taking off the unciform process, as the inner wall of the antrum is opened as soon as this is removed.

Dr. OTTO T. FREER: Quite a number of years ago Holbrook Curtis gave a description of an intra-nasal antrum operation in which he used trephine and burr. I modified this operation. In the course of ten years I have had unvarying success in opening with the trephine and burr. I have had complete recovery in some sixty cases of antral suppuration. Most of them got well as soon as there was an opening in the lower meatus. It is not always necessary to resect the anterior turbinated body. The trouble with the Ingals operation is that you get a beautiful opening at first, with a tendency to contraction. Whether I use the Ingals burr or another method, I think his tube may be a valuable aid in keeping an opening. Referring to Hajek's operation, it cannot be denied that he has done a large amount of work since 1905. He has enough cases now to speak authoritatively. He has another flap operation which should be studied. He objects to the rasp on account of the danger of breaking down everything and inducing meningitis. He works with a burr which I have used, and have found to be a safe instrument. Hajek is absolutely right in regard to his burr. The cutting forward is apt to be followed by contraction. I did not object to the term "agger nasi cell," but I did object to the term "uncinate cell."

GEORGE E. SHAMBAUGH: The question raised by Dr. Casselberry with reference to the danger of setting up meningitis holds if the wrong method is followed in operating upon the ethmoid. Taking the whole mesial plate of the ethmoid, and pulling and tearing off pieces, will lead to extension which will eventuate in meningitis. That should be left alone, and work be confined to the labyrinth. The labyrinth itself has no communication with the intradural space. As to the use of the rasp: I do not push and pull down, but use it gently. Used properly, it is not a dangerous instrument. It is unfortunate when everybody tries to use different terms for the same anatomical structure. Most anatomical terms are fixed by the anatomical nomenclature. The term "infundibulum" is used incorrectly. "Infundibulum ethmoidale" is the term used by the Nomenclature Congress at Basle. Another term which we have been using wrongly throughout this discussion is the synonym for inflammation of the sinus—"sinuitis," which has been incorrectly called "sinusitis." We might as well get into the habit of using correct terms.

THE AMERICAN LARYNGOLOGICAL, RHINOLOGICAL, AND OTOLOGICAL SOCIETY.

Meeting at Chicago, June 15 and 16, 1915.

Technique of Suspension Laryngoscopy, with Lantern Slides and New Instruments.—Robert Clyde Lynch.—Dr. Lynch presented his modification of the suspension apparatus of Killian, with the latest improvements which he has devised to overcome difficulties encountered with the older models. He described the technique as now employed by

him. The chief modifications in the apparatus concern the travelling crane, the limited motion of which is overcome by his table top; the Killian hook, which he has so modified as greatly to increase its feasibility; the spatula, which was made of tool steel, so that it is perfectly rigid under the greatest strain.

With the table top with crane attached, arranged so that the base of the crane will be about four inches in advance of the shoulders, with a suction apparatus at hand to care for the secretions, and with the patient quiet and relaxed by a proper anæsthesia, in other words, with the patient properly suspended, the operator has both hands perfectly free for the most accurate work upon the larynx. Instead of pulling, or pinching, or biting at a tumour mass, one can pick it out accurately and carefully. The laryngologist, with this method, can work in the larynx as the general surgeon works upon the skin, or the gynæcologist works in the vagina. Gagging or other motion of the patient is practically impossible, for the larynx is immovably fixed.

Dr. ROBERT LEVY had been particularly interested in the tongue depressor, because at first this had been one of the difficulties, and to keep the tongue out of the way was one of the problems. The object of the original tongue spatula was to keep the tongue in the median line, to press it out of place, and at the same time to prevent the overlapping of the margins of the tongue. Dr. Lynch's instrument had entirely met these requirements.

Dr. WOLFF FREUDENTHAL mentioned two cases which had come under his observation during the last two weeks, and which demonstrated the necessity for some form of suspension apparatus. The first patient was suffering from tuberculosis of the right lung, was very much run down, and could not swallow at all. His physician wrote that unless the epiglottis, which was very much inflamed, could be removed, the end was near. The man's pulse was so weak that when he was carried to the operating room it was necessary to stimulate him for half an hour. Local anæsthesia was employed, he was put under suspension, and the operation performed in the shortest time possible. The whole process healed within two weeks, the patient returned to the mountains, and was able to swallow food. His ultimate recovery, of course, was uncertain. The second case was that of a woman who had swallowed a fish bone. She went to a clinic near by and the young intern sent her to the operating room, but failed to locate the foreign body, thought it was out, and dismissed the patient. Ten days later she consulted the speaker, at which time the entire left side was swollen, especially in the region of the arytenoid. Thinking she had an abscess, he made an incision, but got no pus. He put her under suspension, under general anæsthesia, and removed the entire mass. The foreign body was not found, but the infiltration was extensive. When she recovered from the narcosis she became cyanotic from the blood running down, but this was removed, with some clots, and she recovered quickly.

Dr. WILLIAM B. CHAMBERLIN mentioned a case operated upon by him last winter. The patient was a child, aged eight months, and had swallowed an open safety-pin, which was removed without difficulty by the suspension method. He had had a second case in a child eleven months old, in which he had operated successfully by the same method. A third case was a baby two weeks old. The infant had just been removed from the maternity hospital, when the father came in and found the child choking. On looking into its mouth a large pin could be seen

in the hypopharynx. When the speaker was called in he thought he was going to see a child two months old, and was discouraged when he learned it was only two weeks old. However, the pin, which was a very large one, was easily removed by turning under suspension. By any other method its removal would have been exceedingly difficult.

Dr. JOHN W. MURPHY mentioned the case of a boy, aged twelve, with a papillomatous growth which almost occluded the larynx. It was necessary to resort to tracheotomy and the removal of a sufficiently large portion of the papilloma to enable the boy to breathe. Several weeks later Dr. Lynch succeeded, by his method, in cleaning out the rest of the papilloma. It was interesting to note the number of onlookers who could see almost every manipulation which the operator made in this larynx. In a week's time this boy was up and able to return to his occupation as a jockey.

Dr. LYNCH, in closing the discussion, referring to the question of anæsthesia, said he preferred general anæsthesia with ether. Warmed ether vapour, as delivered by one of the new methods, had proved very satisfactory. On a recent visit to New York City he had had the pleasure of operating upon a patient under rectal anæsthesia, administered by Dr. Gwathmey. He had had no other experience, but in this case the method worked admirably. There was complete muscular relaxation, the amount of mucus was less than usual, and the exhalation of ether from the lungs was hardly perceptible. He liked to work under cocaine analgesia in patients who were not afraid. Morphine and scopolamin were given first, then a solution of twenty-five per cent. cocaine in fifty per cent. alcohol was employed. One or two drops of this solution in the hypopharynx and on the laryngeal face of the tongue, then one or two drops of an aqueous solution of cocaine into the larynx, had given good results in his experience, enabling him to work for an hour or an hour and a half without difficulty. The suction apparatus which he used was a dental vacuum apparatus on an ordinary turbine pump, with a long tube which could be run down into the larynx and trachea for the purpose of removing clots of blood or anything else. After the patient had been under suspension for twenty minutes or half an hour, thick,ropy mucus accumulated in the pharynx, and this should be removed before the patient was taken from the suspension apparatus; otherwise this mucus would drop down into the larynx and choke the patient. He had never had vomiting under suspension.

The Tonsil Operation: an Inquiry into the Actual Results observed in a Series of Cases. — D. J. Gibb Wishart. — Not feeling comfortable in permitting the enucleation of the tonsil in every child where operation appears to be called for, and yet not having been able to glean anything from the abundant literature provided upon the question, which would show him the proper course to pursue, the author set out upon the examination of cases which had been operated upon since he adopted the enucleation method, ten years ago. He hoped thus to arrive at some data which would enable him to act with greater confidence, both with regard to his private *clientile* and in the instruction of students. Letters were sent to each patient on the history cards, just as they came, and with no omissions or selections. All cases which presented themselves were tabulated. The results were noted under the following heads: (1) Occupation; (2) Sex; (3) Age at the time of operation; (4) Years since operation; (5) Previous operations, if any;

(6) Symptoms complained of; (7) Effect of operation upon these; (8) Anatomical conditions resulting from operation; (9) Effect of operation upon voice; (10) Effect of operation on general well-being; (11) Symptoms unrelieved; (12) Remarks.

The records compiled were from: Private patients, twenty-eight cases in all, of which five were obtained by correspondence, and twenty-three examined personally; those obtained from the Hospital Clinic, by Dr. McKelvey, seventeen in number. Because of faulty histories or the stupidity of parents, the records in the latter division were incomplete.

Sex and Age.—Three to fifty-two years, the cases being about equally divided between the sexes up to fifteen; after puberty, in the proportion of two males to eleven females.

Time since Operation.—Average five to seven years; no instance less than two years; in seventeen cases eight years and over.

Effect of Operation upon Symptoms Complained of.—Not only were the symptoms (tonsillitis, 10 cases; frequent colds, 14 cases; enlarged glands, 3 cases; voice defects, 11 cases; swelling and aching throat, 12 cases; ear affections, 10 cases; rheumatic symptoms, 4 cases; and headache, cough, enuresis, neuralgia, iritis, debility, restlessness, chorea, endocarditis, quinsy, dulness, etc., in 1 or more instances) complained of relieved, but it was notable that in 19 cases the health was decidedly improved, and in no case was it deteriorated. The results of operation upon the symptoms actually present at the time when consultation took place were so uniformly good that the operation itself was justified. It was to be noted that, in hospital cases, where portions of the tonsil remained *in situ*, the effect upon symptoms was no better, if as good, as in private patients where enucleation was complete. It was not apparent that leaving a portion of the tonsils resulted in any benefit whatever to the patient, nor did the complete removal exert any deleterious effect.

Anatomical results.—In patients from three to eleven years of age the results were apparently perfect in seven cases, the position of the palate normal in eleven cases, and in three cases there were minor variations which might or might not be considered as defects. In one private case a small patch of tonsil in the lower left sinus gave rise, seven years after operation, to swollen glands. In six clinical cases there were defects, chiefly the presence of small tags. In cases from twelve to fifteen years of age, results were apparently perfect in two cases; in one there was a marked variation in the curve of the palate arch; in one there was obliteration of the pillars, and in three there were scars.

In cases from twenty-one to fifty-seven years of age, the results were apparently perfect in five cases. In three there were minor variations, not necessarily to be considered as defects. In four cases there were real defects. In the most seriously deformed of these last four, the voice was definitely improved, and in one a good singing voice had been developed. In the cases in which the tonsil was extirpated in its entirety the anatomical results were undoubtedly best. In ten cases the notes failed to show whether there were adventitious bands of adhesion due to repeated attacks of inflammation in the tonsils, but the lesions of the pillars found present after operation could undoubtedly be ascribed to such a condition. The patients who had suffered from repeated attacks of tonsillitis were those in whom scars and malpositions were most numerous.

The effect upon the voice was carefully inquired into in all cases. Careful analysis of the results led to the deduction that the effect of extra-

capsular enucleation upon the singing voice or fatigued voice was not prejudicial, but might be considered beneficial.

General Well-being.—Practically every case was singularly corroborative of the view, long held, that the removal of diseased tonsils attended by marked improvement in the general health of the patient.

Symptoms Unrelieved.—In fifteen cases these were mentioned. In three the nose was the seat of the trouble; in five the symptom complained of was aside from the question. In two endocarditis was noted, once as a new symptom, once as recurring in a post-operative attack. In one case nervousness and choreic tendency were thought to be independent of the original throat condition.

Remarks.—Under this head the author directed special attention to certain features of individual cases. The results of his investigation were presented in tabular form.

Partial Paralysis of the Soft Palate following Removal of Tonsils and Adenoids.—**Observations on the Tonsil and Adenoid Operation.**—**Dunbar Roy.**—The patient, in the case reported, was a male, aged four and a half, operated upon in the hospital May 20, 1913, for removal of tonsils and adenoid tissue in the naso-pharynx. Complete removal was accomplished without trouble and with less traumatism than usual. Two days later the patient was out playing, with no signs of bad after-effects. The throat was not painful on deglutition, and there was but a slight amount of exudate in the tonsillar cavities. Ten days after the operation the child was taken to the writer's office with the history of having, two days before, a temperature of 101 F., some malaise, and some inability to articulate distinctly. In attempting to swallow liquids some of the fluid came back through the nose. Two days before noticing these symptoms the child had been allowed to eat an excessive dinner.

Examination showed the pharynx and naso-pharynx to be in good condition, with only slight signs of inflammation. The tonsils had been thoroughly extirpated, and both pillars appeared normal. There was no pain. The tongue was white and coated. When the patient talked there were all the signs of paresis of the soft palate, just as is frequently seen after diphtheria. The family physician expressed the opinion that the paresis was due to intestinal toxæmia. Laxatives, strychnine, light diet, and irrigation of the naso-pharynx with alkaline solutions, followed by touching with a solution of argyrol, brought about prompt improvement in the local and general condition, and the child was soon apparently perfectly well, except for the voice and a leathery appearance of the soft palate. The patient continued to improve, but it was nearly two months after the operation before the voice was practically normal.

Ill-effects upon the throat following the radical removal of the tonsils and adenoids have been commented upon by many observers, but the author had encountered no mention, in the literature of the last few years, of the sequela of partial paralysis of the soft palate. Inexperienced operators, obsessed with the idea of radicalism, have caused much damage to throats which would otherwise have been better had they never been touched. Operations for the removal of tonsils and adenoids should not be looked upon as a simple procedure, but should have the same thought as any other major surgical operation. The operator should find the one technique which gives him the best results—that which leaves the throat in as normal a condition as possible—and should adhere to this in all his operations.

In the case reported, the only one the author had ever seen, the fact that tonsillectomy and adenectomy were both performed, it was impossible to say which operation was the cause of the paresis. On the other hand, it might be argued that the paresis was accidental and entirely independent of the operation, especially since cases of paresis of the soft palate had been reported as being one type of chorea. The fact that the paresis occurred ten days after operation did not entirely exclude the condition as standing in the light of a *propter hoc*. His own opinion was that the paresis followed the adenoid portion of the operation, and that infection was the result of a traumatism on the posterior surface of the soft palate, which was manifested by the thick leathery condition found ten days after operation.

In the light of this experience he was convinced that operators too frequently use an unnecessary amount of force and traumatism in the removal of adenoids, especially in very young subjects, in whom the naso-pharynx is very small. In the case reported he used small-sized Brandage forceps for the removal of the adenoids. Since that time he had abandoned the forceps in this operation, because of the danger, in opening the forceps in the naso-pharynx of small children, of traumatism of the soft palate. The La Force adenectome, without the large anterior bulbous portion, followed by the use of small Gottstein curettes, was, to him, the ideal operation.

The author gives the replies to the inquiry: "Have you ever seen a total or partial paralysis of the soft palate following the removal of the faucial tonsils, naso-pharyngeal adenoids, or both?" which he directed to fifty members of the Society.¹

Dr. GEORGE L. RICHARDS gave briefly a review of 188 cases in children operated upon by himself and his assistants during the last two years. It was found that the result was good in 144 cases, or 77 per cent. By *good* he meant that the anterior pillar was there as a folded-over pillar, and not as a narrow line. The result was fair in thirty-eight cases, or 20 per cent. By *fair* he meant that there remained some scars. There were six cases, or 3 per cent., in which the results were poor. The voice was very bad in two cases, in which the uvula was caught and in which there was a distinct scar. He thought these would have a nasal tone, but they sang the scale perfectly well. He had reports of some of the children covering two years. It was a curious fact that if the anterior pillar alone was injured and the posterior pillar was not, the child had a good voice. Of the 188 cases, twenty, or 9 per cent., had scars. By *scars* he meant contractions in which a little line could be seen. There was a tendency on the part of Nature to replace more or less lymphoid tissue, and this manifested itself in granulations in the pharynx. Many patients complained of this, which gave a "serapy" sensation, especially in winter. There were forty-five cases, or 25 per cent., in which these granulations could be seen. The pillars were injured in twenty-three cases, or 12 per cent., some sort of a little nick or injury having been inflicted. It was very easy to leave some remnant of the tonsil; this had been done in sixteen cases, or 8 per cent. There was no hæmorrhage. The patients, operated upon in the morning, were kept in the hospital until afternoon and then allowed to go home. Whether complete mouth-breathers or not, sixteen, or 8 per cent., breathed through the mouth where a part of the adenoids had been left. In order to be

¹ There is no indication of any examination having been made for the Klebs-Loeffler bacillus.—ED., JOURN. OF LARYNGOL., RHINOL., AND OTOL.

absolutely accurate as to results with reference to the voice, one must make records of this before the operation. Five, or 2 per cent., of his cases already lisped. Dr. Richards presented a plaster model of the pharynx, upon which he demonstrated the relationship of the tonsils and the pillars. After a perfectly satisfactory operation the anterior and posterior pillars should be distinct, and not fused together.

Dr. WILLIAM B. CHAMBERLIN considered any method of tonsillectomy good which removed the tonsil and nothing else. The structure most easily injured was the posterior pillar at the junction with the uvula. The posterior pillar, which was extremely delicate, could be torn, just as could a piece of cloth. A quadrilateral palate might result. In his experience, as doubtless in that of others, disappointing results had been obtained in cases in which he thought the operative procedure absolutely perfect. This was due to the contraction of the scar tissue. He had never had an unsatisfactory result so far as the voice was concerned, not even for its finer uses, as by singers and public speakers. Sometimes, in the removal of the adenoids after the tonsil operation, laceration of the posterior pillar was noted. This was the result of the gagging of the patient, plus the traction of the curette, thus causing injury to the pillar. It was important, after the adenoid operation, to palpate the naso-pharynx to see that every portion of adenoid tissue had been removed. Injury to the posterior pillar might result from rough handling in the examination by the finger. If, with the adenoid curette, one continued the sweep too far downward, it was easily possible to strip off the entire mucosa of the posterior pharyngeal wall, leaving cicatricial tissue instead of healthy mucosa.

Dr. J. A. STUCKY: In his section of the country tonsillectomy was being performed not only by general practitioners but by general surgeons. In his college town there were several thousand students, and many teachers were constantly referring pupils to him for some defect in speech and vocalisation. The Society should go on record as advocating that the tonsil operation is not a minor operation, and that it is underestimated and under-paid. It should be considered as a hospital operation. Those who teach students should see that every step of the operation is seen by them. The point made by Dr. Chamberlin was a very important one. It should be done gently, however. The fingers of many operators were too large for this, and for that reason he advocated the use of a postnasal sponge-holder, with which one could go in and swab out the pharyngeal vault as carefully as the gynaecologist would swab the fundus of the uterus.

Dr. WENDELL C. PHILLIPS, referring to Dr. Wishart's statement concerning Case 12 of the series, that operation was probably done too late in life to be useful so far as hearing was concerned, said if seven years were added to the patient's age it would then be time for otosclerosis to appear; besides, the mother had deafness. Earlier operation would have had the same result. So much had been said from time to time about the danger of removing the tonsils from singers that he had become very careful in this regard. He had not had an extensive experience in operating on singers, but in every case in which he had removed the tonsils not only had the voice not been injured but it had been improved by the procedure. Within the last few months he had advised the removal of the tonsils from a man, a singer, a patient of Dr. Babbitt's, who had typical cheesy masses in the crypts of the tonsils. After being told that if he were to read the literature of the subject he would be dis-

couraged as to the possible effect of the operation upon his voice, the patient said the effect of the tonsillitis on his voice was so bad that he might as well have the operation, as he would not sing much otherwise. Dr. Babbitt removed the tonsils, and the man's voice was very much improved.

Dr. JOHN F. BARNHILL said it should be regarded as a settled fact that tonsils should be removed completely. He had been particularly impressed by Dr. Wishart's statement to the effect that imperfect operations were done abroad, that he had seen many of these cases done in America, and had had to do the work over. The speaker had never regretted taking out tonsils completely whenever it was necessary to take them out at all, and he had always regretted imperfect work. He thought some of the symptoms mentioned following tonsillectomy were not due to the tonsils at all, but to some of the structures not removed. For instance, if any diseased portion of Waldeyer's ring were not removed it would continue to become inflamed. The adenoid ring in its effects might be confused with the old trouble. The lingual tonsil became inflamed over and over again. There was an attempt on the part of Nature to restore some of the tissue which had been removed, and there might be soreness of the lingual tonsil which did not exist or was not noticed before. He had seen paralysis of the soft palate following these operations, as suggested by Dr. Roy, and had considered it due, in some cases, to infiltration, and in some to traumatism caused by the finger in the vault of the pharynx, together with marked contraction of the soft palate. He had seen sloughing of the uvula in some of these cases. He cited one case in which the uvula, which had apparently not been injured, sloughed away ten days later. No harm resulted from it.

Dr. SIDNEY YANKAUER agreed with the other speakers with reference to the importance of avoiding roughness in handling the tissues in tonsil and adenoid operations. Undoubtedly many of the bad results reported from time to time were due to this error of technique. It was not difficult to imagine the amount of injury that might be done by an inexperienced operator with a rough gauze sponge rubbed about in the pharynx. For a number of years he had used a suction apparatus for the removal of blood and mucus from the throat, thus eliminating all traumatism. He had discarded gauze sponges entirely; whenever it was necessary to use any sponges, he employed soft sea-sponges. In this way he had been able to avoid all traumatism, and the patient could take a full meal in from twenty-four to forty-eight hours.

Dr. JAMES F. McCaw cited a case called to mind by Dr. Roy's paper. The patient, a little girl, aged five, had paralysis of the soft palate immediately following the adenoid and tonsil operation. He had attributed it to his over-zealousness in attempting to rid the child of every vestige of adenoid tissue, by using an over-large adenotome. The paralysis lasted seven or eight months.

Dr. G. HUDSON MAKUEN wished to say a word in his own defence, inasmuch as reference had been made to something he had written bearing on this subject. One thing upon which he had ceased to speculate concerning the tonsil operation was the idea that the mere removal of the faucial tonsil injures the voice. When the removal of the faucial tonsil was absolutely indicated, and when it was properly removed, no injury could result. When its removal was indicated, the tonsil itself was a menace to the voice. The thing that injured the voice was the faulty removal of the faucial tonsil or the adenoids. An operation which tended to paralyse or to mutilate the soft palate must of necessity injure

the voice. An important thing in this connection was what might be called the musical instinct. If a singer had a musical ear and a musical brain he would sing fairly well even with a damaged pharynx. Just as a good violinist could make good music on a poor instrument, so a good singer could have a good voice with an indifferent vocal instrument.

DR. GEORGE F. KEIPER had had two cases of paralysis of the soft palate following the tonsil and adenoid operation, due, he thought, to the use of the palate retractor. If, in inserting the finger, one would hug the posterior pharyngeal wall, one would not be apt to injure the soft palate, even if the patient gagged. He had abandoned the use of the retractor.

DR. CLIFTON M. MILLER emphasised the importance of warning patients who sing not to begin to use the voice in the higher registers too soon after the tonsil and adenoid operation. He cited the case of a young lady whose tonsils he removed, warning her not to use the voice in the higher registers for six weeks, but to confine her use to the middle or normal registers. At the end of three weeks she felt so well that she began to sing in the high registers, and her voice broke. The mental effect was so profound that instead of being able to use the upper registers in six weeks it was six months before she could do so. The psychic effect on these patients, with their highly organised nervous systems, was apt to be very profound, and for this reason they should be emphatically warned.

DR. GREENFIELD SLUDER emphasised the point made by Dr. Richards in reference to Nature's attempts to reproduce lymphoid tissue after tonsillectomy. He called attention to the fact that the lingual tonsil gives rise to a lymphoid growth, which extends into the tonsillar fossa, and at times reproduces what is anatomically perfectly corresponding to the original tonsil and clinically takes on all of its pernicious activities. He mentioned also that in many cases pharyngitis lateralis was developed, also being at times clinically pernicious. Whether these reproductions of lymphoid masses be a part of Nature's effort in healing, or whether they be a manifestation of continued diseased activities, is a question that he had not been able to solve. In the *Archiv für Laryngologie* for 1913, Dr. Oswald Levinstein described what he termed a new pathological tonsil which developed in the lateral aspect of the tongue just anterior to the palatoglossal fold. The speaker had confirmed Dr. Levinstein's observations, finding this hypertrophy of lymphoid follicles massed together in such a way as to resemble a tonsil in cases of "painful tongue," the condition described by Sir Henry Batlin in his monograph, "Diseases of the Tongue," in which the lymphoid follicles at the junction of the palatoglossal fold with the tongue proper were the only demonstrative lesions. Levinstein attributes this tonsillar development to irritation in the lymphoid tissue. This surely seems to be a development in a pathological line. He had also been interested in the question of the production of scars in the throat, and had frequently noted the quadrilateral palate mentioned by Dr. Chamberlin. This might occur regardless of the method employed for the tonsillectomy, and comes to pass because of the fact that the operator cannot control the fixing or focussing of the scar which must needs develop. He thought it advantageous to focus the scar anterior and below by drawing the palate downward and forward, which pulls it away from the Eustachian tube above. He thought this to be a definite help in cases where the tonsil is removed because of the Eustachian tube irritation. He did not believe, from an extensive observation, that this interfered in any way with speech or the artistic use of the voice. He mentioned that he had

dwelt upon this point (drawing the palate downward and forward) in his paper to the American Medical Association in 1910, in which he described a "Method of Tonsillectomy by means of the Alveolar Eminence of the Mandible and the Guillotine." Answering a question by Dr. Richards regarding his earlier cases, Dr. Sluder explained that he had formerly considered the plica tonsillaris as a part of the pillar. It was with this idea in mind that he made the statement that he always removed a portion of the anterior pillar which tended to fix or focus the scar downward and forward, and that usually a few muscle-fibres were attached to it. The careful examination of hundreds of tonsils reveals that very seldom is much muscle-fibre attached, and that with a little attention to this point the entire palatoglossus may be pushed aside, and the plica, with the membrane covering it, removed, in no sense and in no degree injuring the pillar proper. His ideas concerning the pillar and the plica are gained from the work of Dr. George Fetterolf on the "Anatomy of the Tonsil and its Capsule," published in the *American Journal of Medical Sciences* in 1912. Fetterolf's conception is that the plica tonsillaris is a fold of the capsule of the tonsil pushed inward over the tonsillar mass, carrying a layer of mucous membrane with it, and that the pillar proper is constituted by the palatoglossus muscle. In other words, the statement made in the speaker's paper of 1910 was a confusion in the nomenclature.

Dr. WISHART, in closing the discussion, said he had not met with any continued paralysis of the soft palate after operation, and he had used the finger very largely—never, however, while the patient was retching. He always saw to it that the patient was in the proper condition of anæsthesia before he attempted to remove adenoids. He would rather give a little more anæsthetic than run the risk of over-stretching the soft palate. Many of the bad after-effects were caused by too much sponging. The assistant should stand in the right position with reference to the patient, so that he could see the parts, and the sponge should never be turned round. He had merely cited Dr. Makuen's article, and had presented these cases as notes upon it, not as a criticism.

Dr. ROY, in closing the discussion, said it had seemed to him important to bring the subject before the Society, inasmuch as he had never heard of anyone, in the literature or otherwise, who had encountered a case of this kind, and that, in writing to members of the profession, he had found it much more common than he had imagined. He did not want to go into the matter of technique, or to advocate this or that method; he did say, however, that one should not change from a well-recognised technique, which one had used and knew how to use successfully, to a new method. In the majority of cases the operation was performed too hurriedly, often without stopping or waiting for the oozing, which frequently occurred, to cease, and without seeing just where the instrument was going. The correction of these errors in technique would lessen the number of traumatic and unsatisfactory after-results. He had never employed a suction apparatus, which, it seemed to him, sucked the blood out of the arterioles and veins, and tended to keep up the bleeding. He operated slowly in doing tonsillectomy, and had very few drops of blood. A sponge put into the cavity and allowed to remain for a while would prevent bleeding. If, as Dr. Stucky had suggested, the operation were considered a major operation, always to be performed in a hospital, and if the operator were always careful to see the entire field to know just where his instrument is going, better results would be obtained than had been previously accomplished.

Abstracts.

NOSE.

Glogau, Otto.—Dacryo-cysto-rhinostomy. "Laryngoscope," 1915, p. 28.

Glogau describes a modification of the operation invented by West and Halle. The lateral wall of the nose is cocaineised. Through the previously slit canaliculus the sac is first washed out with antiseptic and then cocaineised. A lacrymal probe is then introduced. At the anterior attachment of the middle turbinate a portion of the superior maxillary bone, together with its lining of mucous membrane, is removed until a hole of about 3 mm. diameter is formed, and until the chisel strikes the lacrymal probe that is pushed by the assistant towards the nasal cavity. A piece of the inner wall of the sac is then excised, according to West and Halle. A thin probe with an eyelet at its proximal end is now introduced, until it can be seen emerging from the opening of the sac into the nasal cavity. Through the eyelet No. 2 white silk has been threaded. The blunt end of the probe is then caught by means of nasal forceps and the entire probe pulled into the nose. The end of the silk thread thus emerging from the nose is then tied to the other end protruding from the canaliculus. No external dressing is needed, though the silk drain remains in place for several weeks. The patient is not annoyed at all by the thread. By means of a piece of cotton wool a 10 per cent. solution of protargol is applied to the thread, and the latter moved up and down so that the medicament is brought into intimate contact with the new naso-lacrymal duct.

J. S. Fraser.

EAR.

Kerrison, Philip D.—The Psychology of Deafness. "Laryngoscope," 1915, p. 257.

Kerrison maintains that there is a psychological, as well as a pathological, factor in most cases of advanced deafness. Two individuals in whom careful hearing tests show the same degree of deafness may differ greatly in their power of interpreting conversation. Such differences may be due to the fact that one deaf person is better able to interpret such speech sounds as come to him, because he has a quicker and more synthetic type of mind enabling him to grasp quickly the meaning of a sentence imperfectly heard. We must not, however, forget that the faculty of lip-reading is possessed by all partially deaf people in some degree.

Kerrison holds that the ordinary speech test is far from scientifically accurate in ascertaining a patient's hearing power, for the following reasons: (1) If numbers are used, the patient quickly becomes accustomed to the sounds and is soon able to repeat them correctly. (2) If words are used, the patient soon learns the aurist's test-word vocabulary. (3) When words of more than one syllable are used, certain consonants may be nearly inaudible to the patient, yet the combination and sequence of the vowel sounds and such consonants as he does hear may give him the clue. (4) All partially deaf people hear certain consonants more distinctly than others. Kerrison finds the names of cities convenient

test words. After calling out several numbers, which the patient has repeated correctly, he suddenly interjects the word Chicago, to which the patient replies "sixty-four" or "seventy-four"—numbers which have a remote resemblance in sound to "Chicago."

Kerrison now uses monosyllables, which, of course, do not contain any sequence of vowel sounds to suggest the word. The patient is not required to close either ear, but is seated within four or five feet of the examiner, and looks away from him to eliminate lip-reading. The patient is instructed to *repeat promptly the words or sounds as they are heard*. Kerrison's test-tables consist of seventeen columns, each column consisting of seven words beginning with the same consonant. Thus, the first column is as follows: bad, band, bed, bend, bard, bold, bond. Beginning with the first word of this column, the examiner calls the words in an average tone of voice from left to right—first the words at the top of each column, *e. g.* bad, cad, dab, fad, gap, hard, jay, lad, mad, nap, pad, rat, sat, tap, vat, wall, zeal; then the second line, and so on. Only the patient's errors are noted on his test card. When the whole table has been gone over one notes the character of the errors, and can thus determine the comparative loss of hearing for the various consonants. Kerrison then makes out a list of practice words containing the consonants which are badly heard, and the patient is instructed to get a friend to call the words over to him several times daily. After several days of practice there is, as a rule, considerable improvement. The order in which the words are spoken is constantly varied. A patient who may be quite uncertain in his recognition of two words spoken singly and separately, may readily distinguish between them when spoken together, *e. g.* bent and tent. This justifies one in saying that if the patient can distinguish the words when spoken in quick succession, he should with practice be able to recognise the "b" and "t" sounds singly.

With regard to the psychic factor in deafness, Kerrison points out that certain deaf individuals gradually and subconsciously surrender their place in the social and working world around them. Such people, realising that they are at a disadvantage, shun society and make no productive effort. They explain all the shortcomings of their lives as the result of their deafness. Thus a vicious circle is set up. To combat these tendencies it is essential that the patient be stimulated to sustained effort in his own behalf. Patients with quick minds catch a word here and there and from these deduce the words which have escaped them. They may even lose whole sentences and yet be able to pick up the line of thought from what follows. This may be compared to the stage at which every linguist arrives in the study of a foreign language when he is able to follow the drift of a conversation, though words, and even sentences, escape him. A deaf patient should seek frequent opportunities for conversation with as many different people as possible, though with only one at a time. He must practice the habit of undivided attention and must not worry if he cannot hear every word which is spoken. He must try to deduce from what he does hear the general trend of the conversation, and resist the inclination to unnecessary interruption. Lastly, he should cultivate the habit of lip-reading, which, according to Pearce, is a universal faculty, *i. e.* a faculty possessed by those of normal hearing as well as by the deaf. Kerrison himself is conscious of some impairment of hearing, but still finds no difficulty in general conversation, and can enjoy a play from most seats in the parquet. He at once took up the

study of lip-reading, and now, by watching the lips of patients, he has no difficulty in determining whether they answer correctly or incorrectly when he calls out his lists of words.

J. S. Fraser.

MISCELLANEOUS.

Otto J. Stein.—**Hypophyseal Growth Operated on through the Nose and Sphenoid.** "Laryngoscope," 1915, p. 159.

Stein's patient was a female aged thirty-five. Menstruation began at thirteen and ceased at twenty-three. Three years ago the vision of the left eye became reduced, and for the last year this has been much worse. Examination of the nervous system showed no focal symptoms of paralysis, but the consensual Wernicke pupil reaction was present. The right eye showed choked disc, but the vision equalled $\frac{20}{20}$. The left disc was pale and flat, the nerve head atrophic, and vision reduced to light perception. The patient complained of violent bi-temporal headaches and dizziness. The patient was a very large woman and weighed 230 lbs., but she was not of the acromegalic type, and the obesity was of the infantile type seen in hypopituitarism. She was sexually impotent. Knee-jerks reduced, four or five attacks of vertigo daily. X ray showed conspicuous involvement of the sella. *Operation:* Hypodermic of scopolamin, grs. $\frac{1}{150}$, and morphia $\frac{1}{6}$ were given and repeated in one hour. One c.c. of pituitrin was also injected. The nasal septum and right middle turbinal were then carefully anaesthetised with a cotton applicator, moistened in adrenalin solution and coated with cocaine. A rapid submucous resection of the septum was now performed back to the rostrum of the sphenoid. The right middle turbinal was then entirely removed. These two procedures gave amply sufficient room. Now, by means of Killian's extra long bi-valve nasal speculum, the septal flaps were held thoroughly apart to allow of painstaking elevation of the thin periosteum covering the rostrum and anterior wall of the sphenoid. The membranes were then retracted with an extra long and wide retractor, while, with a sharp spoon or sphenoid punch forceps, the wall of the sphenoidal sinus was rapidly removed along with the septum between the two sinuses. On entering the sphenoid cavity a slight amount of bloody serous fluid was met with, and the probe made out that the floor of the sella was defective in places as a soft mass was occasionally felt. Touching the dura mater caused the patient great pain. Stein states that the probe by accident entered the brain on the left side, causing immediate collapse of the patient, with slow pulse and respiration and dilated pupils. The operation was hastily completed, an iodoform gauze drain being placed between the septal flaps. The patient soon recovered, and the slight paresis of the right side disappeared within a few days. There was no disturbance of speech. Seven days later considerable improvement in vision was noted, and the headache had entirely disappeared. The patient can now read and sew and has got rid of her vertigo. The visual fields have increased in size, though the discs are still choked. With the left eye the patient can count fingers at eight feet.

Stein states that the early operations on the hypophysis by the nasal route entailed clearing out most of the nasal structures, and hence left objectionable after-effects. Stein does not follow Cushing's method of

making the original incision through the mucous membrane at the junction of the gum and upper lip, but adopts the procedure first reported by Oscar Hirsch, which has just been described. Cushing holds that the mere feat of removing a tumour is not the only thing to be borne in mind, for this is a sorry accomplishment if the patient is left blind, palsied, aphasic, epileptic, or continues to be intellectually or physically crippled in any way. Hirsch's method has several advantages: (1) Local anaesthesia; (2) little destruction of tissue; (3) most aseptic; (4) little danger of infection; (5) no bad after-effects in nose or throat. In addition to the ordinary instruments for submucous resection, Stein uses the Killian extra long bi-valve speculum, an extra long and wide hand retractor that will pull aside one entire flap from the incision to the base of the sphenoid; long-handled mastoid chisels; mastoid sharp spoons with long handles; a small strong hook on a long handle, for removal of the floor of the sella. The following points are of importance: (1) maintenance of an unbroken muco-periosteal flap in order to thoroughly protect your line of retreat and avoid after-infection. (2) Elevation of the periosteum from the face of the sphenoid. In some cases the tumour may be encountered immediately on entering the sphenoid, as the tegmen of the sinus may have been absorbed. If not, a long narrow-handled chisel should be used to chip away the tegmen. Further progress may be made by the use of the sphenoid punch, the smooth mushroom head of which pushes away the dura and so avoids damage to the gland or tumour. A careful study of a good X-ray picture is an absolute necessity. One must not go too high for fear of entering the anterior fossa and injuring the chiasma, or too low, for then one may get into the middle fossa or the thick bone of the basishenoid. On the other hand, if one goes too far to the side, there is the danger of injuring the cavernous sinus, the carotid artery, and the optic nerve.

J. S. Fraser.

REVIEW.

Pye's Surgical Handicraft: A Manual of Surgical Manipulations, Minor Surgery, and other Matters connected with the work of House-Surgeons and Surgical Dressers. Edited and largely rewritten by W. H. CLAYTON-GREENE, B.A., M.B., B.C.(Camb.), F.R.C.S. (Eng.). Seventh edition, fully revised with some additional matter and illustrations. Pp. 614. Price 15s. net, 1916. Bristol: John Wright and Sons, Ltd.; London: Simpkin, Marshall, Hamilton, Kent and Co., Ltd.; Toronto: The Macmillan Company of Canada, Ltd.

Pye's *Surgical Handicraft*, when it first appeared, was at once popular, on account of its intrinsic value, and also of a further peculiar attractiveness derived from its genial author, Walter Pye. It has been edited and largely re-written by Mr. Clayton-Greene with the happiest result. A further edition, the seventh, has been called for within a comparatively short number of years. Considerable pains have been expended by the editor and his collaborators to bring this latest edition well up to date. Mr. Carson has had charge of the sections on the surgery of the throat, nose, and ear, and he has crammed into the space at his disposal an

extraordinary amount of practical information. A strange omission is that of meningitis from among the complications of middle-ear suppuration, while lateral sinus thrombosis, temporo-sphenoidal and cerebellar abscess are somewhat fully described. The chapter on bullet and shell wounds has been revised in view of the advancement and development of the experience gained in the earlier part of the present war. Dr. Fleming reports the more recent advances in the diagnosis and treatment of syphilis, and Dr. G. Harrison Orton brings his up-to-date experience to bear on the uses of the X-rays in diagnosis and treatment. Mr. Leslie Paton, in his contribution on the minor surgery of the eye, gives a good description of West's intra-nasal operation for suppuration of the lachrymal sac. The work is invaluable to house-surgeons and young practitioners, and it will be read with profit by many of the highly experienced.

Dundas Grant.

NOTES AND QUERIES.

Mr. W. Douglas Harmer, who has been working in Russia for a year with the Anglo-Russian Hospital, has returned to London and has resumed practice.

THE MILITARY CROSS.

Among the recipients of this coveted decoration we are interested to observe the name of Temp. Capt. Nicol McNicoll Rankin, R.A.M.C., who has been awarded the honour "for conspicuous gallantry and devotion to duty in remaining at his post and attending to the wounded after the regimental aid-post had received three direct hits and he himself had been wounded in the face. For four hours he continued at duty, the area around his aid-post being heavily shelled all the time."

Previous to joining the Army, Capt. Rankin was one of the Registrars at the Central London Throat and Ear Hospital.

BOOKS RECEIVED.

Chirurgia di Guerra: Orecchio, Prime Vie Respiratorie e Loro Complicazione Intracraniche. By *Prof. Gherardo Ferreri*.

The Catarrhal and Suppurative Diseases of the Accessory Sinuses of the Nose. By *Ross Hall Skillern, M.D.* Philadelphia and London: J. B. Lippincott Company. Second Edition. Price 21s. net.

Diseases of the Throat, Nose, and Ear, for Practitioners and Students. By *W. G. Postu, M.B., B.Sc., F.R.C.S.Ed.* Second Edition. Fully Revised for the Author during his absence from England in the service of his Country by *P. McBride, M.D.Ed., F.R.C.S.Ed., F.R.S.E.* Bristol: John Wright & Sons, Ltd. London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd. Toronto: The Macmillan Co. of Canada, Ltd. 1916. Price 7s. 6d. net.

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